

MYOKINETIC

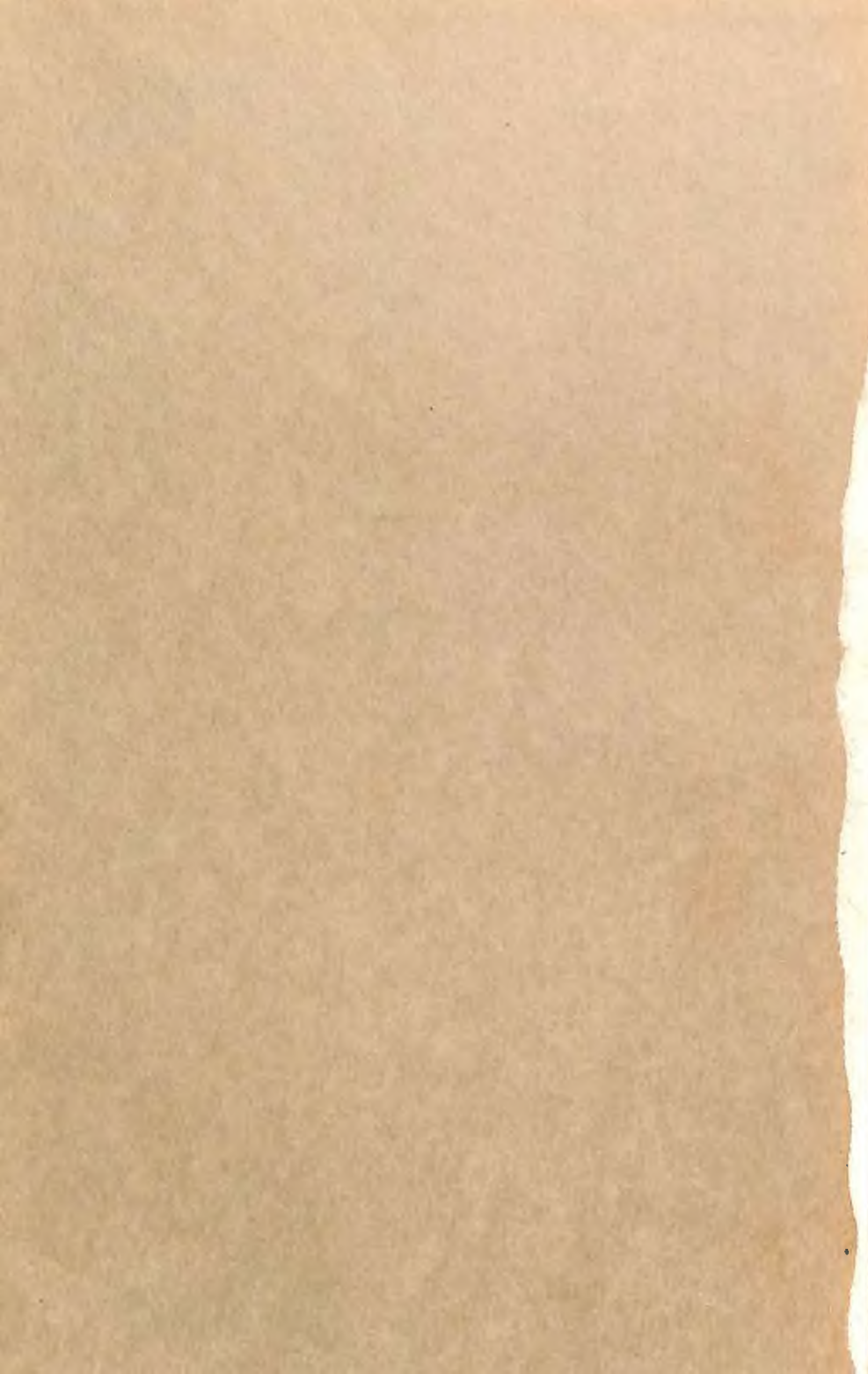
PSYCHODIAGNOSIS

M. K. P.

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# MYOKINETIC PSYCHODIAGNOSIS

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## FOREWORD

For two reasons this is an important book. First, it contains a diagnostic method of large promise, and thus potentially enriches our store of techniques for analyzing personality. Second, it fixes our attention on the most neglected area of personality theory—the area dealing with underlying dispositions of temperament as these are manifested in expressive movement.

Modern dynamic psychology easily incorporates *projective* methods, but up to now has had little place for *expressive* methods. The reason, it seems to me, lies in the dazzling promise that projective methods will somehow uncover “the unconscious,” and thanks to Freud we have plenty of knowledge and hypotheses about the unconscious. But what do expressive methods show? Where is the theory that will help us to interpret individual differences in gesture, posture, handwriting, gait, facial ex-

pression, styles of laughter, handshake, and vocal inflection? We know vaguely that these individual motor signatures reveal much—in everyday life we rely on them heavily—but psychologists, at least in America, shy away from this important area of study. They do so partly because they lack clear-cut theories to guide research; partly because of a lingering aura of charlatanry that hovers over graphology and physiognomy; and partly because studies in this area are difficult to execute.

One obstacle to studying expressive behavior is the fact that (with the exception of handwriting and other graphic records) it is fugitive and hard to capture; and furthermore it is difficult to separate the expressive aspects of movement from the adaptive aspects. While the signature of individuality is surely present in every motor act, the act itself is likewise controlled and rectified by one's intentions (by one's effort to cope or communicate). It is rectified and influenced also by cultural convention and constraint, by visual and other sensory cues that tend to keep the expressive impulses within bounds, and by feedback from the observer that results in socialized and re-directed movement.

The method of myokinetic diagnosis is ingenious in that it almost completely avoids these limitations. Professor Mira first asks his subject to trace a few meaningless lines. (This minimum of adaptive instruction is needed to start the subject off.) He then removes all visual cues and asks the subject to continue the drawing blindly. There are no cultural conventions to guide the task. The subject makes no language responses, thereby avoiding this powerful influence toward conventionalization. There is no feedback, no knowledge of right or wrong. This clever technique



leaves impulsivity in virtually full command, though it likewise measures the control the subject tries to exert over his temperamental impulses. An important feature of the test is its comparison of the drawings made by the dominant hand with those made by the non-dominant hand.

In Chapter Six Professor Mira lists the dimensions of temperament which he believes his method taps. Among them are depressed and euphoric tendencies, intrapsychic coherence (integratedness), excitation and inhibition, anxiety and apathy, aggressiveness, introversion and extroversion, and certain pathological trends. He likewise believes that a test of intelligence may be derived from the battery, non-verbal though it is.

As the editors clearly state in their Preface the standardization of the test and its validation are far from complete. Professor Mira and his associates have already devoted two decades of work to the development of myokinetic psychodiagnosis, but much remains to be done. This first accessible report of the method in the English language opens up a wide horizon. Technicians skilled in diagnostic tests will eventually simplify the procedure and tackle problems of reliability and validation. Theorists, let us hope, will gain an incentive from M.K.P. to examine afresh the composition of temperament and the significance of motor impulse.

Professor Mira is to be honored for the originality of his contribution to the psychology of expression. The translator and hard-working editors have placed all English-speaking psychologists in their debt.



## EDITORS' PREFACE

In presenting Myokinetic Psychodiagnosis to American psychologists the editors believe that they are participating in an event possibly paralleling in importance the introduction of the Rorschach Test to these shores. One of us, Dr. Leopold Bellak, initiated the project of bringing Mira's work to the American scene when he first heard Professor Mira present his data at the 1942 Salmon Lecture of the New York Academy of Medicine.

The possibility of assessing and assigning meaning to behavioral manifestations of pre-verbal origin is indeed an exciting prospect. The further possibility of comparing such manifestations with more organized, higher-level manifestations is a promise of psychological sophistication and clinical practicality that merits the studious attention of all behavioral scientists. In this test we may well have the vehicle for insight into the motor correlates of per-

sonality, those indelible imprints of pre-semantic experience, and also the primary constitutional variations now being observed among infants.

These are the possibilities and the promises of Mira's ingenious contribution. He begins with the assumption that psychic activity is communicated into somatic activity, specifically into skeletal muscular tonicity. He compels expression of this tonicity with six sets of simple line figures which the subject reproduces under varied conditions designed to produce different degrees of muscular tension. The dominant hand is expected to show more ego expression in that it exercises more practiced control; the weaker hand, lacking the same degree of voluntary corrective control, is looked upon for more instinctive, unconscious expressions. The dominant hand will be better able to defend against impulses, impulse derivatives, and dissociation than the weaker hand. These are not Mira's words (he uses the more characteristic European terms of character and temperament) but we believe this is the dynamic formulation inherent in his approach.

Editing this work has been a rewarding experience for us, during which we have been students of a skilled clinician, gifted with creative imagination, and the ability to synthesize his imaginative speculation into concrete, testable forms. Mira is also provocative—one responds to his constructions with one's own notions of applications, experiments and insights.

We must admit, however, that the task of editing Mira has also been laborious. Translation difficulties arose in which the balance might hang upon a single word that psychologically meant nothing to us. Some of the scoring procedures are extremely complicated and required trac-

ing and retracing of the French text. We have dealt with these problems by communication with Professor Mira and with French authorities—Dr. Pierre Pichot deserves our particular thanks—and by sheer sweat of working through repeated attempts at understanding. We do, of course, accept ultimate responsibility for the clarity of the text.

Another type of difficulty involved editorial decisions to include or exclude sections that seemed to have little meaning (even without translation problems) or promise. This was uneasily resolved with the decision to include everything that he wrote—we kept in mind the rich harvest of ideas that repeated reading of Rorschach has yielded. We were not always in agreement with Professor Mira's theoretical formulations; but this did not diminish our respect for the essence of his technique.

Trained in the American tradition, we were troubled, too, by the knowledge that Mira's test as it now stands does not meet American Psychological Association standards for psychological tests in some important ways, although it does comply with these standards in other respects.

We felt, also, that the test in its present form is too cumbersome for the practicing American psychologist—that the techniques of administration and scoring could be rationalized and hence shortened.

Compliance with APA standards and ultimate rationalization will come with usage. One of us, Dr. Michael H. P. Finn, has been working with the test for several years and his findings will be published soon. His subjects include sizable male and female samples of normals, hospitalized psychiatric patients, and a brain-damaged group.



Our hope is that by presenting Mira's test in its present form the American psychologist will examine, apply, question, verify and extend the test's usefulness and theoretical basis.

More than anything we believe that by adding an expressive-motor diagnostic technique to the psychologists' armamentarium, the efforts to discern the *Anlagen* of personality have acquired a potent ally.

LEOPOLD BELLAK

MICHAEL H. P. FINN

LEONARD SMALL

FRANCES BISHOP

**M . K . P .**



## One : MYOKINETIC

### PSYCHODIAGNOSIS - M. K. P.

The M.K.P. is a psychological test which involves the analysis of graphic expression to indicate attitudinal state, i.e., temperamental and characterological tendencies. Storch<sup>1</sup> applied the term "myopsyche" to all the resources which assure an individual's psychomotor adaptation to his surroundings. These resources remain latent in the external actions of the subject throughout the different phases of the conative cycle, but they may be revealed by an exploration of his postural tonicity. The M.K.P. attempts to do this by detailed examination of movements executed in various spatial planes. Essentially, the test is based on the principle that each intention or reaction is accompanied by a determined *muscular attitude* which tends to favor projected movements and to inhibit non-projected ones.

<sup>1</sup> *Editors' note:* Mira does not furnish bibliographical references for the authors cited in this chapter.

## ANTECEDENTS AND THEORETICAL FOUNDATIONS

Around 1828 the Marquis de Chevreuil reproduced one of Call's experiments demonstrating that the thought of a movement alone could create that movement. He gave his subjects a lead ball tied to the end of a string and asked them to hold the other end of the string between the thumb and index finger of their right hand, their arm extended horizontally. Then he asked them to close their eyes and to imagine different types of movements (rectilinear, oblique, circular) while trying to keep the string of the pendulum motionless between their fingers. After a few seconds the pendulum began to move; later it was confirmed that its movement corresponded exactly to the type of movement the subject had imagined.

Some ten years later, a parlor game became very popular which consisted of hiding an object and asking a "medium" to find it. The "medium" could always find the object if he was allowed to hold the hand of the person who had hidden it. The explanation is simple; the involuntary contractions of the latter's hand guided the "medium" in his gropings.

Toward the end of the century studies of physiognomy, initiated by Lavater, were systematized, and serious studies in graphology were begun. These studies were based on the same theory: content is manifested in form; life is expressed in movement.

During this century we have learned from films that we can identify the mental processes and emotions of a subject by observing his pantomime (we are thinking particu-



larly of documentary films which are “shot” without the subject’s knowledge). Also, the behavioral theory of consciousness was developed, and special tests for the study of activities expressing personality have been expanded.

In 1930 Jacobson published several works in which he demonstrated the enormous importance of variations in muscular tone in determining the course of intellectual, affective, and volitional processes. Here, in paraphrase, are some of his conclusions: The specific contraction of muscles is not only concomitant to the occurrence of certain mental activities, but essential to their beginning, because the thought of a particular act cannot be produced if the muscles which assure the execution of that act are completely relaxed. For example, when we observe a series of photos of arms (magnified eighty times), taken while the subject was thinking about moving them, we can see real movements (with an enlargement) which fluctuate between .07 and .32 millimeters.

In their excellent book, *Studies of Expressive Movements*, published in 1931, Allport and Vernon demonstrated that psychomotor tests have a reliability and a validity equal to those of intelligence tests. They also suggested the possibility of undertaking scientific studies on the expressive value of graphic gestures, such as the drawing of simple geometric lines and figures. Finally, they stated: “It is evident that there is a correspondence (‘congruity’) between expressive movements and attitudes, traits, values, and other dispositions of the inner personality.”

J. Downey developed an important series of psychomotor, graphic tests in 1931. The “Will and Temperament Test” is particularly well known to psychologists, many of

whom have found it extremely confusing. On further investigation it proved to have high repeat reliability but no validity with regard to the variables it proposed to measure. Both Downey's book, *Will and Temperament Test*, and her ideas were too soon forgotten in the enthusiasm for projective tests, but authors like Thurstone and Eysenck still believe that her ideas deserve re-evaluation. Thus Thurstone wrote, "The majority of psychologists would probably consider that the early work of June Downey is fading and may be on the wrong track. I believe that she had something in studying the temperament by experimental methods rather than by questionnaires. It would probably be profitable to resume that direction but it would not be necessary to use only writing as a means of research."

I had previously been impressed by the therapeutic effects of medical gymnastic and relaxation exercises in many cases of mental disorder. I was also impressed by the success of occupational therapy which aims to change the "fixed" muscular attitudes caused by illness. Therefore, in 1933, I began to use movies and movie tests in the exploration of personality, in an attempt to discover a simple way to study motor expression of psychic tensions.

In 1936 my colleagues and I were authorized to build an instrument (the axistereometer) to measure the muscular memory and kinesthetic sense of candidates for the air force of the Spanish Republic. We were struck by the observation that errors of the candidates in their kinesthetic estimation of space were not distributed according to the curve of normal probability, but were constant in certain directions, and furnished typical individual "stereo-

grammes." We then had to assume the existence of a factor responsible for the systematic deviation of the errors (certain subjects underestimated the space in certain directions and overestimated it in others). Analysis showed these tendencies to be due to variations in postural tonicity existing in the different muscular groups used during the test. This indicated that the preliminary muscular attitude of the subject interfered with his ability to perform equal movements and led him into error. It wasn't hard to see that a highly significant correlation existed between a subject's characteristics and the nature of his errors (by way of deviations) in the test. We could infer a certain mental attitude from the performance of movements, and vice versa.

In 1939, while at Maudsley Hospital in London, I undertook a research plan which had previously been sanctioned by Professor Henri Pieron. It attempted to determine whether the systematic deviations observed in the kinaesthetic appreciation of space in relation to different types of personalities would be found in groups of patients suffering from certain psychiatric syndromes. We could be sure of the existence of certain exaggerated reactional attitudes among the patients, such as intra-aggression with suicidal tendencies, extra-aggression, depression, euphoric excitation, and autism. At the same time, I tried to devise a simple technique for the recording and statistical analysis of the variations in muscle tension which these patients manifested during the test.

Thus the M.K.P. was developed; and in October, 1939 I outlined the general theory of its foundation, its technique, and provisional results. An extract of this communi-

cation (Proceedings of the Royal Society of Medicine, Psychology Section, February 1940) follows.

Individual intentions; i.e., the intentions of an action, are accompanied by "in-tensions" or muscular tensions. The muscular groups which permit the execution of planned and wished-for actions receive an augmentation of their postural tone and, consequently, are in the condition of facilitation for their contraction, while those which would oppose such an execution are found automatically inhibited in their postural tone.

If an individual is to be prepared for combat, a proper muscular attitude for the start of aggressive movements should be established in him. (That is why throughout all history military leaders have insisted so much on attaining what they call "military posture" in which extensor muscles of the body and limbs are slightly hyper-extended.)

All the facts observed in the fields of physiognomy, graphology, etc. as well as the expressive art of painters, movie actors (especially at the time of silent films) can be understood in the same way. Even the James-Lange theory could be included in this domain. Thus, one can also explain the benefits obtained by occupational therapy in mental diseases: the execution of new movements may alter the pathologic sets of reaction which had become fixed and rigid in the individual, while still offering the possibility of changing his mental attitude with regard to his environment. Results obtained by shock treatments and convulsive therapies, in general, would also have the same explanation.

## THE PRINCIPLE OF "MYOKINESIS"

Psychological space is not neutral. Every movement acquires, in addition to its mechanical effect, a particular significance according to the way it is executed. (For example, in the occidental culture movements performed in a left-right, down-up, or back-front direction in relation to the subject's body acquire a "progressive" aspect, while those performed in the opposite directions have a "regressive" aspect.) On the other hand, considered objectively, every mental activity comprises a succession of actions performed on the basis of previous attitudes. Each change of conduct requires a change in pre-existing muscular tension and alters its equilibrium formula. Psychic instability and myokinetic instability are two extreme aspects of the same individual process, and consequently certain reciprocal influences obtain. Accordingly, disturbances of psychic tensions should be transferred into the domain of muscular movement, provided we can eliminate the voluntary corrective motor actions of the subject.

## THE PRINCIPLE OF M.K.P.

If a subject is asked to make small oscillatory movements in the fundamental directions of space, and is not permitted to control their extension and direction by sight, a systematic deviation of his movements, indicating



the predominant muscular group, can be observed. This muscle group will indicate, in turn, the subject's type of dominant action in the considered plan of space. If the subject has a dominant attitude of escape or withdrawal, he will have hyperextended the muscles which allow these actions, muscles opposed to those which serve for attack and extension.

#### THE PRINCIPLE OF MYOKINETIC DISSOCIATION

The principle of myokinetic dissociation has been derived from W. Wolff's comparison of facial expressions, gestures, and movements between the two halves of the body. Many authors have confirmed the fact that in each of us half of the body is dominant (generally the right half, which corresponds to the left hemisphere of the brain where the principal central structures which also control spoken language are found). This dominant half is subject to greater evolution and greater instability, but is also more fully controlled by consciousness than the dominated and neglected left half. The latter remains at a more or less primitive infantile stage. For this reason we feel justified in hypothesizing that motor expressions of the dominant half of the body will more readily reveal the characteristic attitudes and reactions of the individual, while those of the weaker side will disclose instinctive or temperamental dispositions. Consequently, Wolff proposes the term "conscious" for the dominant half, and "unconscious," for the dominated half.

Children and adults in primitive cultures characteristically make extremely symmetrical movements, because they have not established a lateral differential. Such people are more simple, more uniform in their personality structure. The M.K.P. obtained from the primitive Negro and Indian shows identical productions for both hands.

#### RECENT CONFIRMATIONS OF THE MOTOR THEORY OF CONSCIOUSNESS

Two authors—Nina Bull and Eysenck—have recently occupied themselves with this question. Both have had occasion to confirm my theoretical postulations. In *Dimensions of Personality* (p. 196) Eysenck writes: "Undeniable experimental evidence exists which confirms the connection existing between the idea or the image of a movement and the beginning of the execution of the movement." This is called the motor-idea tendency, and varies with the individual. In certain cases this tendency is so strong that the movements produced are visible to the unaided eye; in others, certain special procedures are needed to detect them.



## *Two* : TEST MATERIALS AND ADMINISTRATION TECHNIQUE

Proper administration of the test depends on the correct utilization of certain standardized materials, which are described in the following section.

### MATERIALS

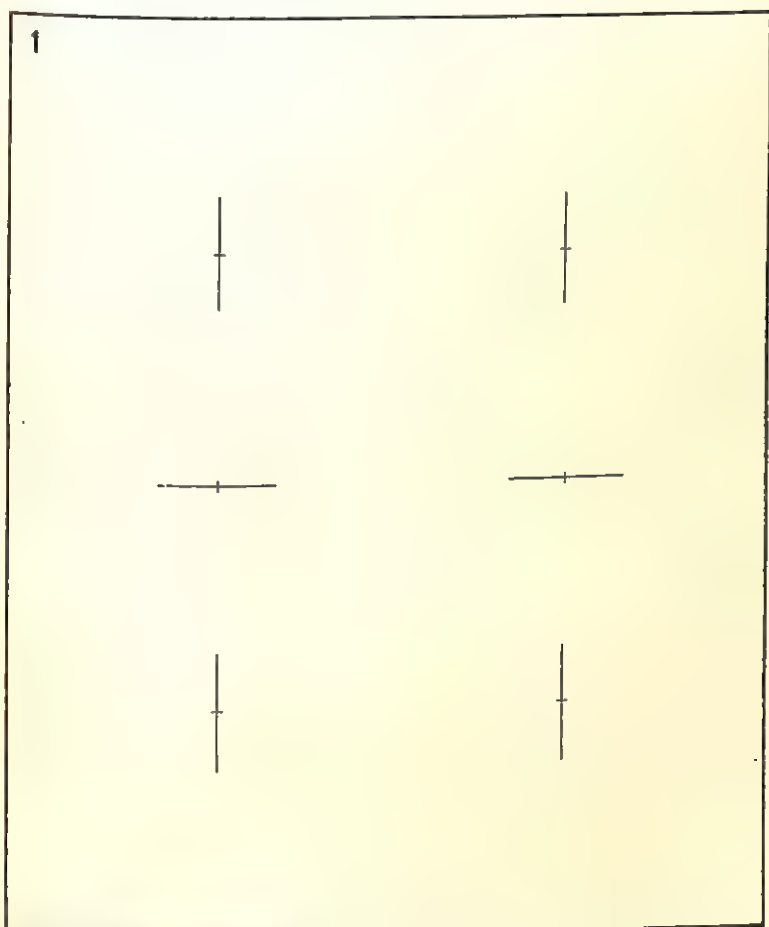
*The Test Booklet:* The test booklet consists of six numbered pages upon which are printed the models of drawings to be executed by the subject (see Figures 1-6).

The order of the drawings is as follows:

- (1) Lineograms
- (2) Zig-Zags
- (3) Stairs and Circles
- (4) Chains

- (5) Egocifugal parallels and Vertical U's
- (6) Egocipetal parallels and Sagittal U's

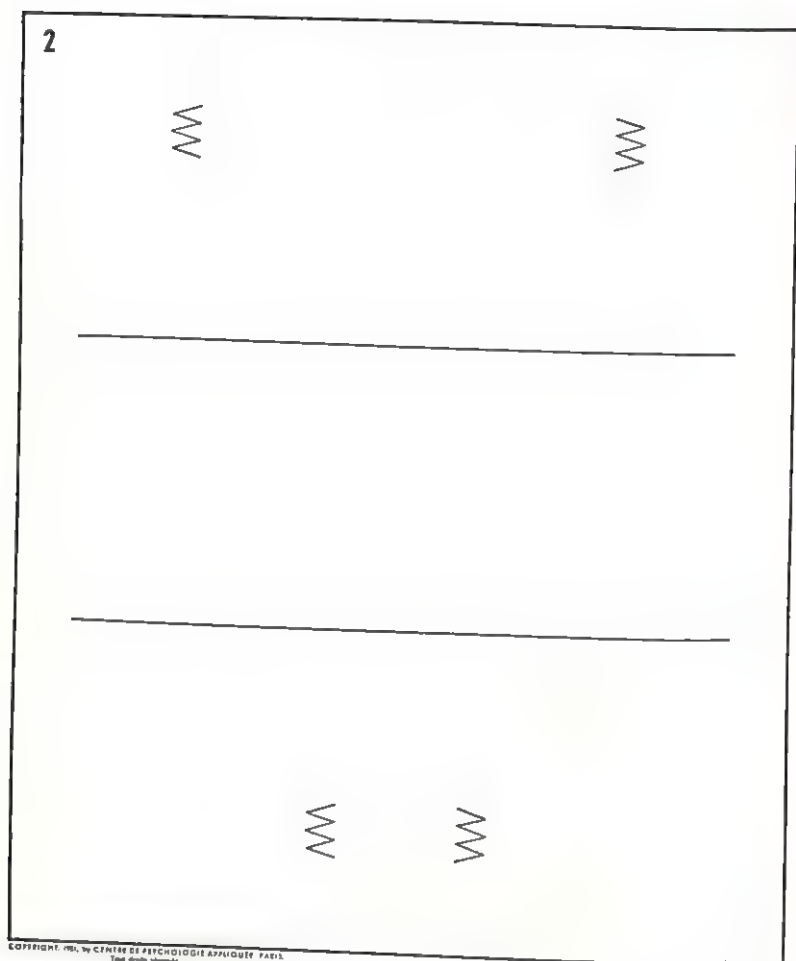
Figure 1 LINEOGRAMS



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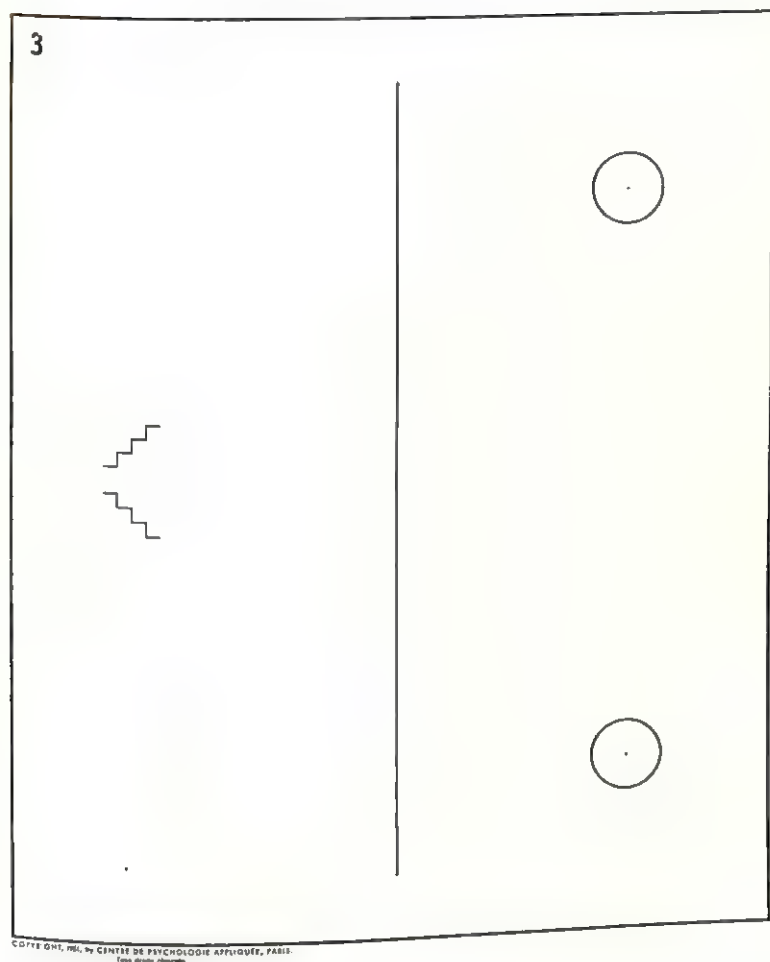
Original size 10¼ x 12½ inches

Figure 2 ZIG-ZAGS



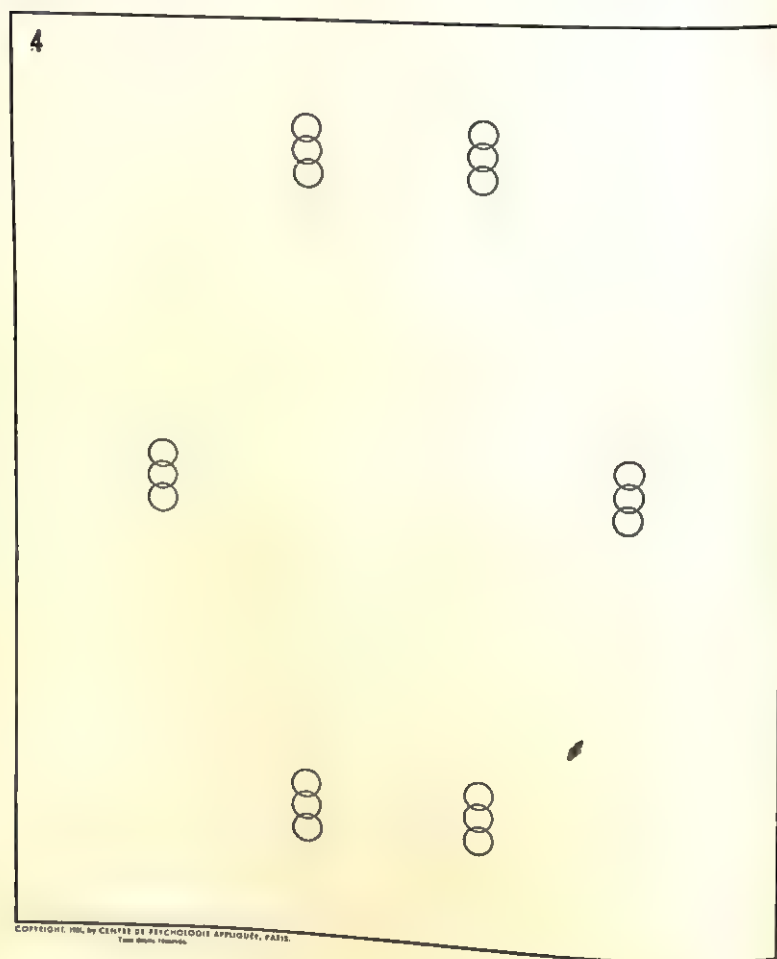
Original size 10¼ x 12½ inches

Figure 3 STAIRS AND CIRCLES



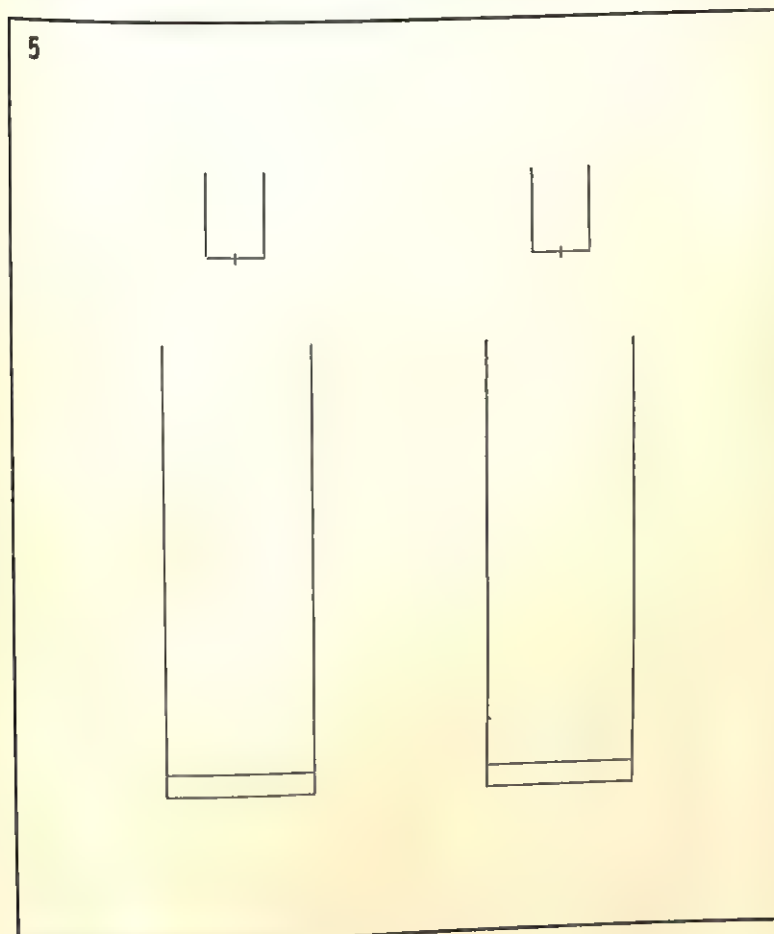
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Figure 4 CHAINS



Original size  $10\frac{1}{4} \times 12\frac{1}{2}$  inches

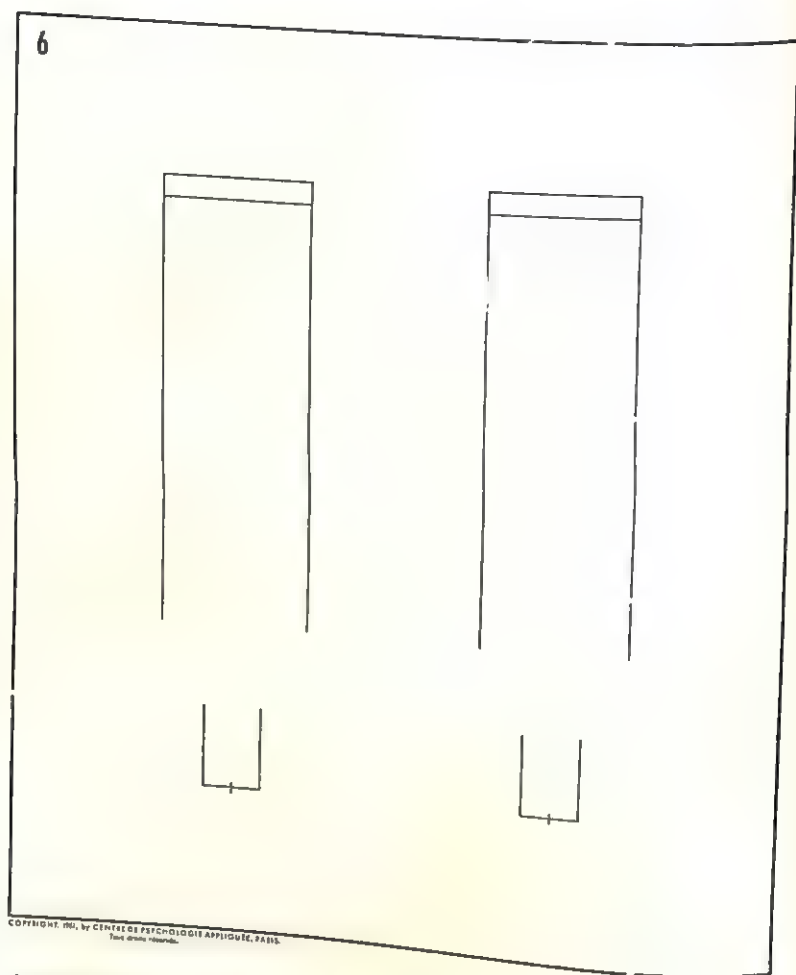
Figure 5 PARALLELS AND U's



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Test given by HANSEN.

Original size  $10\frac{1}{4} \times 12\frac{1}{2}$  inches

Figure 6 PARALLELS AND U's



Original size  $10\frac{1}{4} \times 12\frac{1}{2}$  inches



The size and position of these drawings must follow the established standard; the paper should be thick enough to prevent wrinkling or tearing. Only one side of each page should be used, so that the test can be repeated on the other side in case there is some doubt about the initial results.

*Table:* A special table is needed, which is approximately as high as the navel of the seated subject, leaving him free to move his arms without touching the table. The following dimensions have been found most convenient:

Height: 72 cm.

Table top: 57 cm. long and 45 cm. wide

The table's top should be arranged so that it can easily be swung to a vertical position for certain parts of the test. A thick glass plate (28 cm. x 33 cm.) should be set into the center of the table top; the test booklet is held to the plate by means of clips which are fastened to the table (Figure 7).

Instead of this arrangement, one may use a heavy, smooth board (32 cm. x 40 cm.) placed on a table low enough so that the subject's elbows will be above it. This board can be propped in a vertical position when necessary. The booklet is fastened to the board with thumb tacks.

I recommend the use of the special table. However, in field research portable boards, which can be placed in a vertical position and fitted with the glass plate and clips, are more practical.

*Chair:* A simple, armless chair is best. The subject should sit erect.

*Pencils:* At least two well-sharpened #2 pencils of equal length are required for the subject. The examiner

should have two colored pencils, preferably red, to mark the final lines of the drawings and to give to the subject when he shows a tendency to recross the lines already made.

*Visual-Block Screen:* A strong cardboard screen is needed, of a solid light color (preferably green or gray), which can be interposed between the subject's eyes and the test so as to obstruct his view (Figure 7). This screen should either be held vertically or slightly inclined, depending on the subject's position. The screen must not touch the subject's body nor his pencil.

*Cardboard Covers:* Two cardboard covers are needed to cover the subject's drawings. One of these should measure 20 x 29 cm., the other 7 x 22 cm. They should be solid gray, with reinforced edges so that they may be attached with the clips when the board is in a vertical position.

*Thumb tacks or metal clips:* When using a portable board, the pages must be fastened firmly with thumb tacks or with metal clips.

*Stop-Watch:* This is used discretely to time the execution of the drawings without disturbing the subject.<sup>1</sup>

*A Ruler in Millimeters and a Protractor:* These are used to take the seventy-nine measurements of the subject's drawings. A transparent millimeter ruler and protractor set will facilitate the task.

<sup>1</sup> *Editors' note:* Mira makes no use of chronological data in his interpretations. Response-time is at best a qualitative observation in this test at the present time. Nor does he provide verbo-motor analysis.



*Figure 7* CORRECT POSITION OF THE SUBJECT  
DURING THE EXAMINATION

*Vision is obstructed by the screen*



## ADMINISTRATION TECHNIQUE

*Preliminary Instructions:* The subject should have a favorable attitude toward the test he is about to take. The examiner's explanations may vary with the intelligence and background of the subject, but he must never let it be known that this is a personality test. Thus the subject might be told that the test checks the precision and accuracy of one's movements. Directions concerning the subject's body and pencil positions are then given.

A quiet place is desirable for administration of the test. Care is taken to prevent the subject from seeing any of the drawing. As mentioned above, the subject sits in front of a table low enough so that his elbows are well above it (Figure 7). His body should be at his ordinary writing distance from the table; he must sit erect, his legs uncrossed. The subject supplies information as to name, age, marital status, education. His preferred handedness or ambidexterity is established. The first test is then put before the subject. He is given a pencil, and is told that in making each drawing he must hold the pencil in the middle, and keep it in a vertical position, perpendicular to the paper. Furthermore, he is to draw without resting his hand or elbow, i.e., he must keep his arm in the air, in a horizontal position parallel to the table, so that he can move freely. The arm should form a 45 to 60 degree angle with the thorax. The hand which is not engaged should be placed on the subject's hip, thus eliminating it as a reference point on the table.

People who tend to make all movements with their wrist

S.C.E.R.T., West Bengal

Date .....

Acc. No. ....



are asked to execute the drawings by moving their whole forearm. The subject will frequently find it difficult to maintain the correct position throughout the examination so that it may be necessary, between tests, to correct him.

The test should be given in two sessions; the first session ends with the drawings of the horizontal chains, the second begins with the vertical chains. Although a week is the ideal interval between the two sessions, there are some exceptional cases where the second session can be given after an interval of only twenty-four hours. The test should be repeated at a later date to confirm the obtained data. I recommend repetition after a month, with the same interval of a week between the first and second parts. This provides greater opportunity to eliminate accidental factors.

As the test progresses, cover the drawings with the cardboard covers, so that the subject will not be disturbed or distracted by the sight of his previous work, which he might consider unsatisfactory. The administrator should sit to the right of the subject, except for certain drawings, such as the zig-zags when he will stand opposite. The materials are kept on an adjacent chair or table. The screen should be held in the examiner's left hand, the red pencil in his right hand. The other pencils, as well as the covers, should be within easy reach.

When the subject has completed the test, the examiner records his observations of the subject's attitude, remarks, and difficulties.

#### LINEOGRAMS (FIGURE 8)

The lineogram test consists of six parts administered in the following order:

Figure 8 LINEOGRAMS

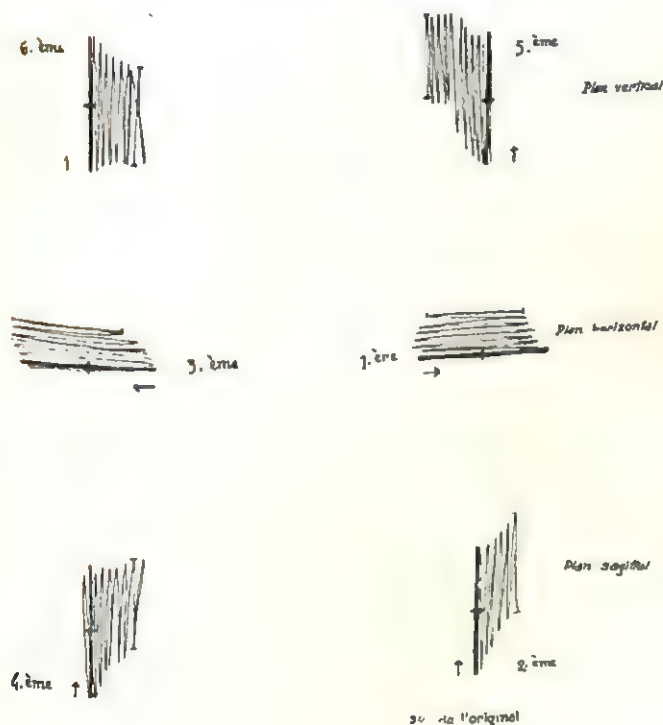
Key

*Plan vertical:* Vertical plane

*Plan horizontal:* Horizontal plane

*Plan sagittal:* Sagittal plane

1<sup>er</sup>—6<sup>ème</sup>: these numbers indicate the order of administration





- |                                   |                                 |
|-----------------------------------|---------------------------------|
| (1) right horizontal <sup>2</sup> | (4) left sagittal               |
| (2) right sagittal <sup>3</sup>   | (5) right vertical <sup>4</sup> |
| (3) left horizontal               | (6) left vertical               |

The examiner says to the subject: "Take this pencil with your right hand (left hand if subject is left-handed) and cover this line (he points out the right horizontal line in the center of the page) from one end to the other, making a movement from side to side without raising the pencil from the paper *even* when I place a screen in front of your eyes. Start your pencil at the inside of the line, at a point nearest the middle of the page. Keep going until I tell you to stop." If the subject does not appear to understand the instructions, the task is demonstrated on another sheet of paper.

Three complete movements are done with visual control (going from side to side a single time is considered one complete movement). Then the examiner interposes the visual-block screen saying, "Keep going until I tell you to stop." The subject is not allowed to close his eyes, for this will cause further disturbances in spatial orientation. When the subject has completed ten complete movements without visual control, he is told to stop. The examiner carefully marks the last line with a colored pencil for measuring, so that it will not be confused with lines which it intersects or superimposes. When the right horizontal lineogram is completed, the subject's drawings are covered

<sup>2</sup> In a horizontal drawing the lines are made in a plane bisecting the long axis of the body.

<sup>3</sup> In a sagittal drawing the lines are made in a plane perpendicular to the long axis of the body.

<sup>4</sup> In a vertical drawing the lines are made in a plane paralleling the long axis of the body.

with the cardboard cover, leaving the other model lines uncovered.

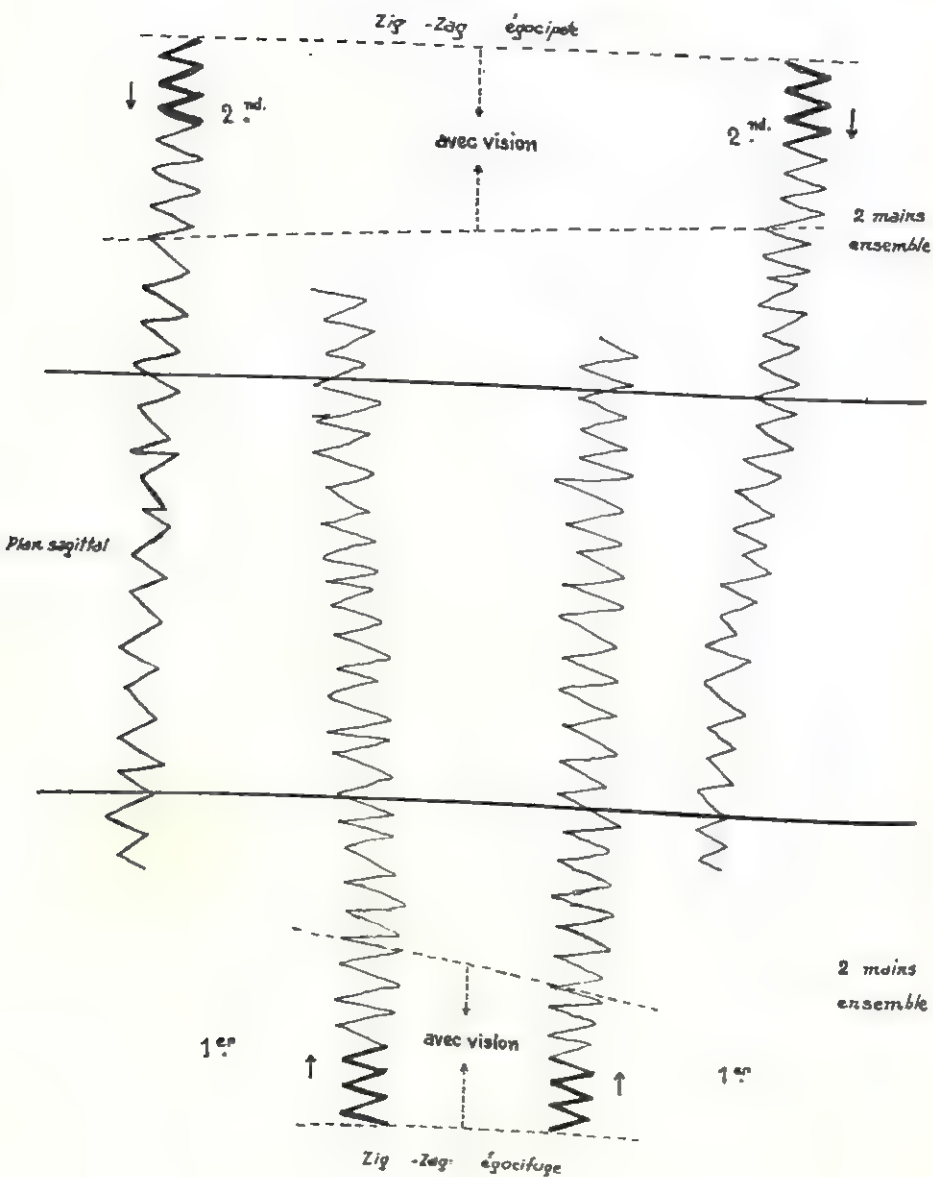
The subject then does the right sagittal lineogram (three complete movements with vision, ten without). When the visual-block screen is interposed, the cover over the previous drawing is removed so that it does not hamper the subject's movements. Subsequent drawings are also covered in this way, and the cover removed when the subject's sight is blocked off.

When the first four drawings are completed, the examiner places the board or table in a vertical position to obtain the vertical lineograms, first the right side, then the left. The same procedure is followed of three movements with vision and then ten without. Particular care must be taken to make sure that the subject's elbow is well raised at an approximately 60° angle to his body.

### ZIG-ZAGS (FIGURE 9)

This test consists of four zig-zags, the two in the lower center of the page representing *egocifugal* (away from the body) movement, and the two on the upper part of the page representing the *egocipetal* (toward the body) movement. In the center of the page are two horizontal lines which are used in subsequent measurements. *This drawing is the only one which is done simultaneously with both hands.*

The *egocifugal* zig-zag is drawn first. The examiner gives the subject two pencils of equal length, one for each hand, and says, "Now go over these lines with the two pencils at the same time, first toward the outside, then toward the inside as you would do with an accordion.



## Figure 9 ZIG-ZAGS

## Key

*Zig-Zag egocipete*: egocipetal Zig-Zags

*avec vision*: with vision

*2 mains ensemble*: two hands at the same time

*plan sagittal*: sagittal plane

*Zig-Zag egocifuge*: egocifugal Zig-Zags

*1<sup>er</sup>-2<sup>nd</sup>*: the order of administration

When you reach the end of the lines, continue drawing the same figures on the paper, trying to keep the same size and direction, so that the drawing will be as regular and as much like the model as possible."

The natural tendency of the subject is to execute the test with his elbows lower than the table; the examiner must ask him to raise them to approximately five centimeters above it. (The subject is told that this is done to prevent his arms from hitting the edge of the table as he moves forward.) During the execution of the zig-zag, the subject should not move his hands in the same direction (homologous zig-zags instead of symmetrical zig-zags). The examiner must be particularly careful to make sure that absent-minded, confused, or rather dull subjects understand the shape of the draft; otherwise, they will tend to draw a ring rather than an angle. That is important, for as we will see later, it will result in an equivocation, what may be called "schizophrenic reversion."

The visual-block screen is interposed when the subject has executed three complete movements beyond the model (six zig-zags in all: three on the pattern and three beyond it). He continues to draw without vision until he reaches

the top of the page, and is stopped before he runs off the paper.

During this test, the examiner should stand opposite the subject. When the egocifugal zig-zag is finished, the result is hidden with the small cover if there are no axial deviations or with the large one if there are marked axial deviations. Each time the subject's vision is blocked, the cardboard cover is removed so that it will not interfere with his movements. The egocipetal zig-zag at the top of the page is then obtained. The subject is asked to repeat (always with his elbow raised) the movements that he has just done, but in the opposite direction, toward his own body.

If there is a great axial deviation in the egocifugal zig-zag drawings, the black pencils may be exchanged for two colored ones when the egocipetal zig-zag is administered to facilitate subsequent measurements.

#### STAIRS AND CIRCLES (FIGURE 10)

The board or table top is placed in the vertical plane for this test, with the stairs at the subject's left and the circles at his right. The test begins with the ascending stairs. The examiner says to the subject, "Please draw over the pattern of these steps and continue doing upward steps until I tell you to draw them coming down," and demonstrates the figure to be drawn. During the entire execution of the stairs, the subject must maintain his arms at an angle of  $60^\circ$  in relation to his body. The screen is interposed when the subject has executed three complete movements beyond the model (six steps in all: three on the pattern and three beyond it).

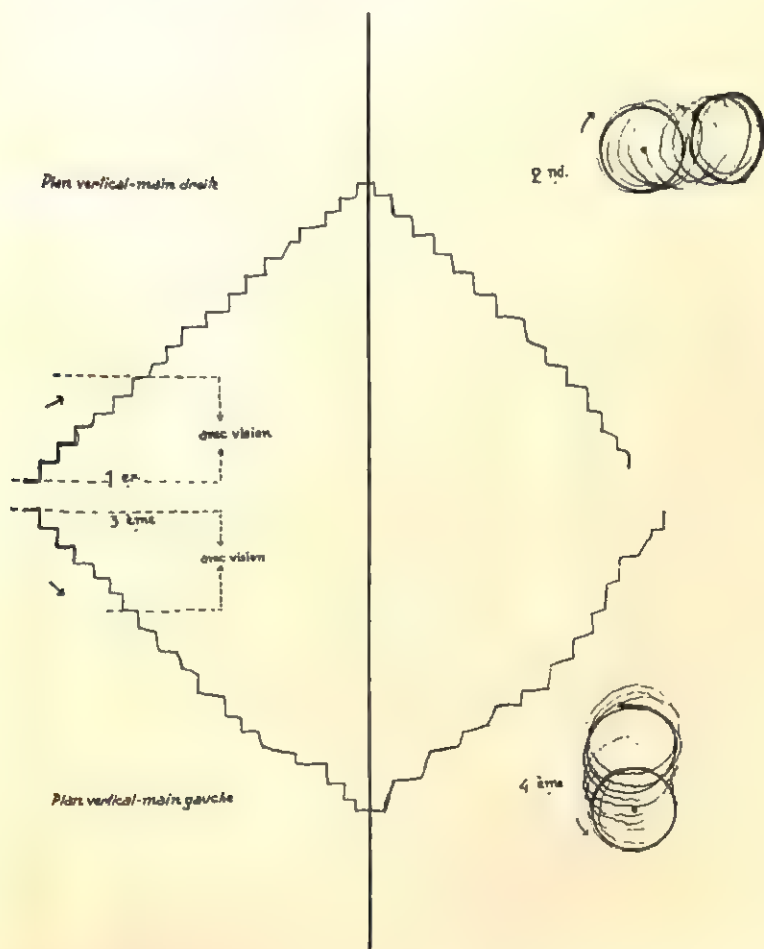
Figure 10 STAIRS AND CIRCLES

Key

*Plan vertical—main droite:* Vertical plane—right hand  
*avec vision:* with vision

*Plan vertical—main gauche:* Vertical plane—left hand

*1<sup>er</sup>—4<sup>ème</sup>:* the order of administration





When the subject reaches the center of the sheet (marked by a vertical line), he is told to start drawing the steps coming down. He is stopped when he reaches a point on the right side approximately opposite the starting point. Again, the completed part is covered before the test is continued.

The upper right circle is then drawn. The subject is instructed to go over the circle clockwise, using a continuous movement without swerving from the model. After three completed circles the screen is interposed as usual, and the test continues until ten circles are completed. The tenth circle, which will be measured, is marked in red pencil by the examiner.

When the right-hand tests are completed (upper stairs and circle), the drawings are covered with the large cardboard. The subject then does the left-hand tests (lower stairs and circle). The stairs are drawn down toward the center of the page, then upward to the right. Finished drawings are covered. The lower circle is drawn counter-clockwise with the left hand.

The examiner then returns the table top to the horizontal plane.

#### CHAINS (FIGURE 11)

The order of administration for this test is:

- (1) Lower right chain, drawn egocifugally with the right hand, clockwise.
- (2) Lateral right chain, drawn egocipetally with the right hand, clockwise.
- (3) Lower left chain, drawn egocifugally with the left hand, counter-clockwise.



- (4) Lateral left chain, drawn egocipetally with the left hand, counter-clockwise.

*Drawings 1-4 are done with the table top in the horizontal plane. The table top is in the vertical plane for drawings 5-8.*

- (5) Lateral right chain, drawn egocipetally with the right hand, clockwise.
- (6) Upper right chain, drawn egocifugally with the right hand, clockwise.
- (7) Lateral left chain, drawn egocipetally with the left hand, counter-clockwise.
- (8) Upper left chain, drawn egocifugally with the left hand, counter-clockwise.

The examiner gives the subject the following instructions: "Hold the pencil at its middle, and vertically. Go over each link in a clockwise (or counter-clockwise) direction, raising the pencil after drawing each link. Continue to do interlocking links even when I place the screen between your eyes and the test."

After completing the model chains, the subject does three more interlocking circles, still looking at the test. The screen is then interposed and the subject continues until he reaches the middle of the page. Each drawing is covered until the visual-block screen is used.

If large axial deviation occurs, a colored pencil is used for the drawings in the opposite direction so that they may be differentiated and measured.

Some individuals continue drawing in one place, although they believe they are moving forward. In such cases, the examiner counts the links that are drawn over, and notes the number in the margin as soon as the subject

Figure 11 CHAINS

Key

*avec vision*: with vision

*Plan vertical*: Vertical plane

*Commencement de la*

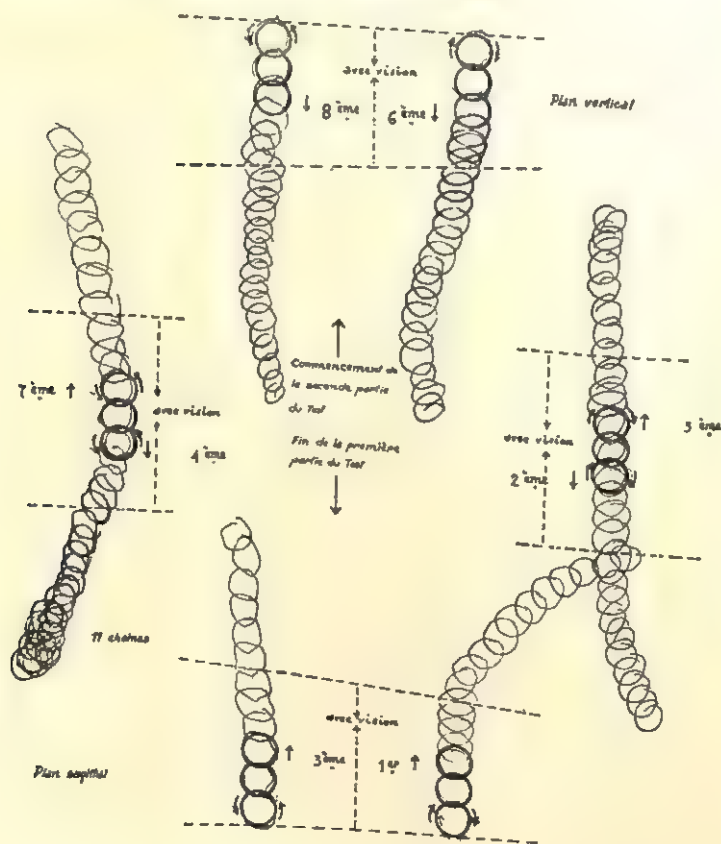
*seconde partie du Test*: Beginning of the second part of the test

*Fin de la première*

*partie du Test*: End of the first part of the test

*Plan sagittal*: Sagittal plane

*1<sup>er</sup>—8<sup>ème</sup>*: the order of administration



is asked to stop (Figure 11, part 4). Should the subject change direction while drawing, he is told about it, and a note made if he persists.

The table top is raised to the vertical plane for the second part of the test which includes drawings 5-8 (see above). The instructions are the same as for those in the sagittal plane. The lateral links now serve as a point of departure for the ascending draft with both hands. As the test proceeds, in order to cover all the drawings the examiner will find it necessary to employ the visual-block screen as well as both the large and small covers.

The table top is returned to the horizontal plane when the drawings are completed and before proceeding to the next test.

#### PARALLELS AND U'S (FIGURES 12 AND 13)

This test utilizes plates 5 and 6 of the test form (Figures 5-6). The order of administration for the drawings on plate 5 is:

- (1) Right parallel drawn egocifugally with the right hand, table top horizontal.
- (2) Left parallel drawn egocifugally with the left hand, table top horizontal.
- (3) Right U drawn egocipetally with the right hand, table top vertical.
- (4) Left U drawn egocipetally with the left hand, table top vertical.

Figure 12 PARALLELS AND U's

Key

*U Plan vertical*: U's in vertical plane  
*avec vision*: with vision

*Plan sagittal*: Sagittal plane

*1<sup>er</sup>—4<sup>ème</sup>*: the order of administration

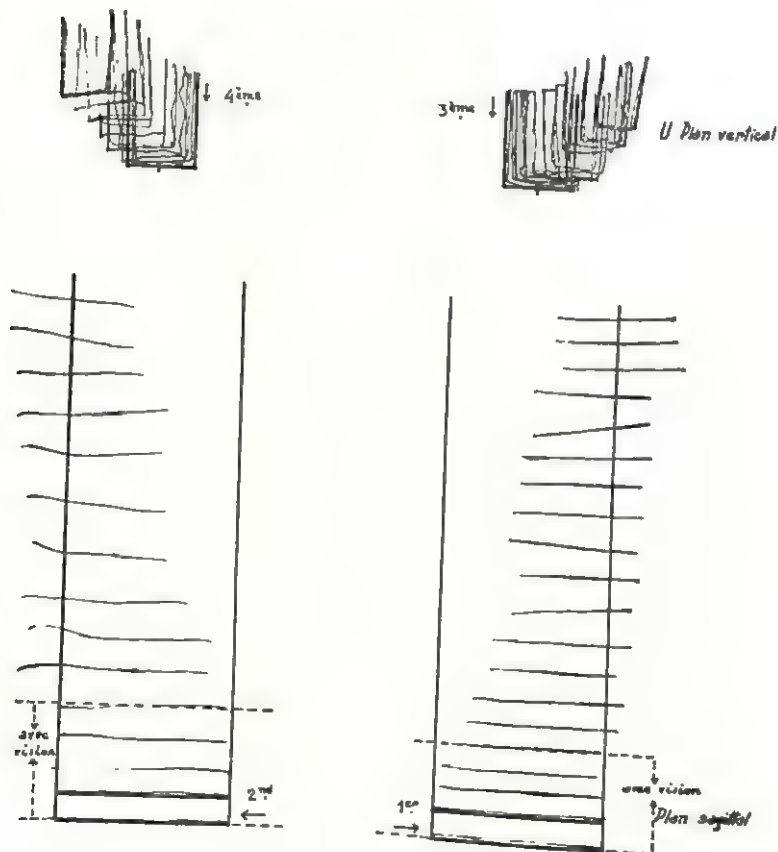


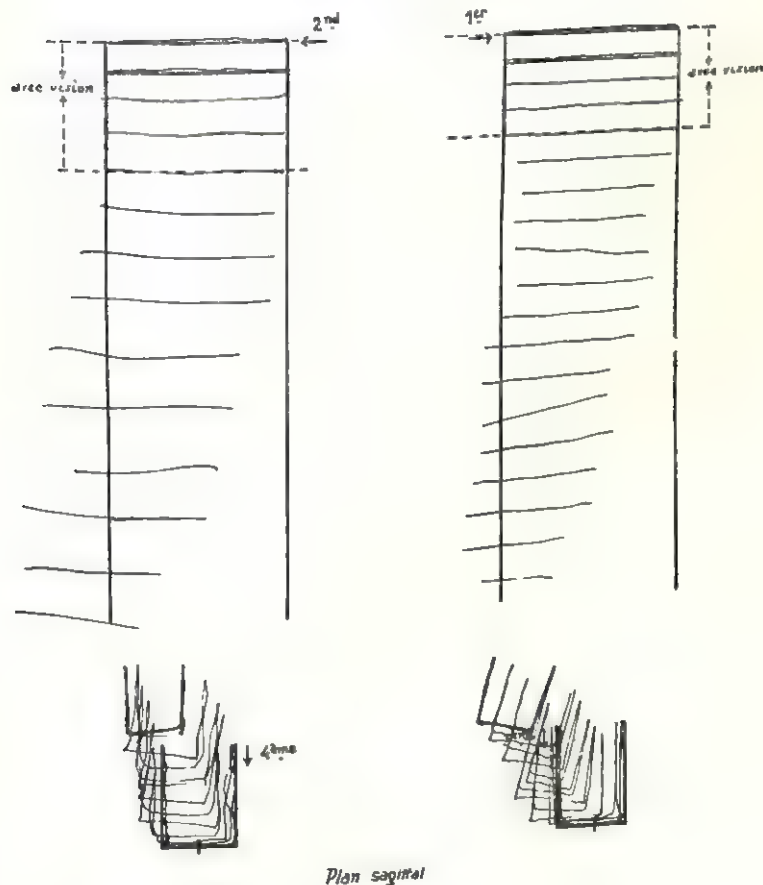
Figure 13 PARALLELS AND U's

Key

*avec vision*: with vision

*Plan sagittal*: Sagittal plane

1<sup>er</sup>—4<sup>ème</sup>: the order of administration



All drawings on plate 6 are made egocipetally with table top in horizontal plane, as follows:

- (1) Right parallel drawn with right hand.
- (2) Left parallel drawn with left hand.
- (3) Right U drawn with right hand.
- (4) Left U drawn with left hand.

The examiner says to the subject: "With your right hand, go over these two parallel lines. Then continue to draw parallel lines of the same length, keeping the same distance between them. Try not to go over the margins." When the subject has drawn three parallel lines with visual control, the screen is interposed and he continues until he reaches the top of the model, or the edge of the sheet. The drawing is covered with the large cardboard, and a similar drawing is obtained with the left hand.

Should the subject begin to draw backwards toward the model, then correct himself and continue in the right direction again, the examiner numbers the lines in the order in which they were made.

The table top is raised into the vertical plane and the subject asked to go over the outline of the U, without raising his pencil. After the pattern is drawn three times (three going, three coming),<sup>5</sup> the subject performs ten more U's without stopping and without visual control. The last U is marked with a colored pencil.

The examiner returns the table top to the horizontal plane and turns to plate 6 of the test. This is done *entirely* in the sagittal plane, using the same directions employed for the preceding parallels and U's.

<sup>5</sup> Editors' note: These directions are patently confusing. However, Mira is emphatic on this point: a single U is actually double, since he defines a single U as one made both coming and going. His rationale is that it prolongs the tension to which the subject's arm is exposed.

## *Three* : MEASUREMENT AND

## INTERPRETATION

Three kinds of data are obtainable: 1) graphic (drawings recorded in the test); 2) verbo-motor<sup>1</sup> (extrinsic gestures, attitudes, comments of the subject during or after the graphic execution); 3) chronological<sup>2</sup> (execution time for the different phases of the test, which in general are related to what we call the individual "response time," with the condition, of course, that no time limit is indicated to the subject, and that he is given full liberty—within the limits of prudence—to execute them quickly or slowly).

All the drawings made by the subject constitute the graphic data, which are the most important. His deviations from the model lines provide a quantitative and qualitative basis for evaluation of his reaction type.

The differences between the performance of the left and the right hand show degrees of interpersonal cohesion and coherence, the striking of a balance, the relation-

<sup>1</sup> and <sup>2</sup> See footnote 1, Chapter Two.

ship between the permanent, deep, constitutional reaction traits and the acquired, transitory, manifest attitudes. The former, temperamental, are more manifest in the less educated hand, the hand less controlled by the mind (usually the left), while the latter characteristically are manifested in the more controlled hand (usually the right). In the zig-zag test, done with both hands simultaneously, we can discover to what degree the individual succeeds in compensating for his usual degree of incoherence, i.e., to what degree each hand is capable of influencing the other in making the drawings.

The data for consideration in the M.K.P. are:

- (1) Lineograms
- (2) Zig-Zags
- (3) Stairs
- (4) Circles
- (5) Chains
- (6) Parallels
- (7) U's
- (8) Intra-psychic coherence

#### LINEOGRAMS

Three basic measures are derived from the lineograms:

- (1) Length of Lines (L)
- (2) Primary Deviation (P.D.)
- (3) Secondary Deviation (S.D.)



## LENGTH OF LINES

*Measurement:* The length of the last line drawn, which was marked in color is measured. Comparison between this last line and the model line (40 mm. in length) indicates the subject's tendency to increase, reduce, or maintain length of line when he is deprived of vision.

*Interpretation:* Reduction of the lines from the model length corresponds to inhibition; increase corresponds to states of excitement. We calculate the average of the lengths for each hand and compare them with the model "T,"<sup>3</sup> corresponding to the characteristic of the group to which the subject belongs.

In general we know that a certain decrease in length of lines is normal. For example, in Montevideo, in a group of nearly 300 adolescents, the average was: Boys: left hand, 38 mm.; right hand, 36 mm. Girls: left hand, 32 mm.; right hand, 32 mm.

Such data show that the instinctive performance of adolescent boys tends to correspond to their performance under conscious control. Adolescent girls notably reduce the length of the lines, thus expressing an inhibition. On the other hand, comparison between the two hands reveals that the adolescent girls are more integrated.

An initial reduction in length of line can be explained by the anxiety of the subject at the beginning of the test. As he relaxes, his line treatment should become less constricted.<sup>4</sup> Variations or fluctuations observed in the length

<sup>3</sup> Editors' note: Mira is apparently referring to the "mean zone" of his norm tables. See Tables 2-10.

<sup>4</sup> M.K.P. data are significant only when they occur repeatedly. At times, one can grasp the major personality characteristic by a qualitative observation of the test as a whole.

of the parallel lines often denote an unstable personality. In a person subjected to *anguish*<sup>5</sup> we can see a progressive shortening of the lengths of the lines as the drawings proceed. Inversely, cases of anxiety can be recognized by the progressive lengthening of the lines.

A sudden lengthening or shortening, that is, any marked change in the drawings, is a rather typical sign of dysrhythmic or epileptic personalities.

For indications of the zones of normality of all the drafts see Tables 1-19.

#### PRIMARY DEVIATION (P.D.)

The primary deviation, the most significant of the lineogram data, expresses the predominant displacement of the lines. This displacement reflects the predominance of the tonicity of one of the two antagonist muscular groups responsible for the draft.

*Measurement* (Figure 14): The examiner projects a perpendicular line from the center of the last line marked in color to the model line or its prolongation, if necessary.

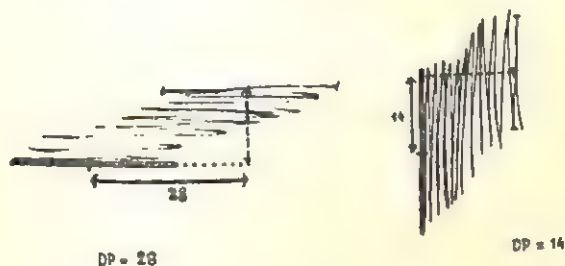
He then measures the distance in millimeters from the center of the model line to the point where it meets the projected perpendicular line. The deviation is positive (given a plus sign) if, as shown in Figure 15, it goes:

<sup>5</sup> Editors' note: We have not been able to translate the French word "angoisse" adequately. Classically in French the word refers to the physical components of anxiety (*anxiété*), but the two words are now used without difference in meaning in technical literature. Our most studied guess is that Mira uses "angoisse" to mean an extreme degree of anxiety.

### Figure 14 LINEOGRAMS

#### Measurement of the Primary Deviation (DP)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



- (1) Toward the right in the horizontal lineograms of the right hand.
- (2) Toward the left in the horizontal lineograms of the left hand.
- (3) Forward in the sagittal lineograms of both hands.
- (4) Upward in the vertical lineograms of both hands.

The deviation is negative (given a minus sign) when the movement goes:

- (1) Toward the left in the horizontal lineograms of the right hand.
- (2) Toward the right in the horizontal lineograms of the left hand.
- (3) Backward for the sagittal lineograms of both hands.
- (4) Downward for the vertical lineograms of both hands.

*Interpretation:* The primary deviation represents the degree of tensional instability between the muscles that

# Figure 15 LINEOGRAMS

## Synthesis of Lineogram Measurements

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

Key

*L:* Length of line

*DP:* Primary Deviation

*DS:* Secondary Deviation

*moyenne L main gauche:* Average length, left hand

*moyenne L main droite:* Average length, right hand

*L* = 20  
*DP* = -2  
*DS* = 10



*L* = 19  
*DP* = +10  
*DS* = 14



*L* = 31  
*DP* = -14  
*DS* = 10



*L* = 27  
*DP* = +33  
*DS* = 11



*L* = 22  
*DP* = +22  
*DS* = 15



*L* = 24  
*DP* = +15  
*DS* = 13



*Moyenne L main gauche* = 24,3  
" " " " = 11,6

*Moyenne L main droite* = 23,3  
" " " " = 12,6

produced the movement. If the muscles all have the same tension, the subject will have a zero primary deviation. If one of the groups dominates the other, we will observe a deviation in the direction of the movement ruled by this group and with a value proportional to the intensity of that predominance. The relation between the primary deviations of each hand, and also the comparison of homologous P.D. of both hands, will give us a picture of the personality as a function of the tensional formula observed.

*The P.D. of horizontal lineograms*, when directed toward the exterior (to the right, for the right lineogram) corresponds to *extratensive* tendencies. When the deviation is directed toward the center of the sheet (to the left, for the right lineogram; and to the right, for the left lineogram) it corresponds to *intratensive* tendencies (Figure 16).

When the P.D. is negative in the left lineogram and positive in the right lineogram, it indicates a naturally intratensive subject who is endeavoring to be extratensive. Inversely, a positive P.D. in the left lineogram, and negative at the right, indicates a naturally extratensive subject who is intratensive at the time of testing.

*The P.D. of sagittal lineograms* indicates the subject's aggressiveness. When directed toward the exterior world (hetero-aggressiveness) that is, forward, it is positive. When directed toward the subject's body, that is, "egocipetal" (auto-aggressiveness), it is negative (Figure 16).

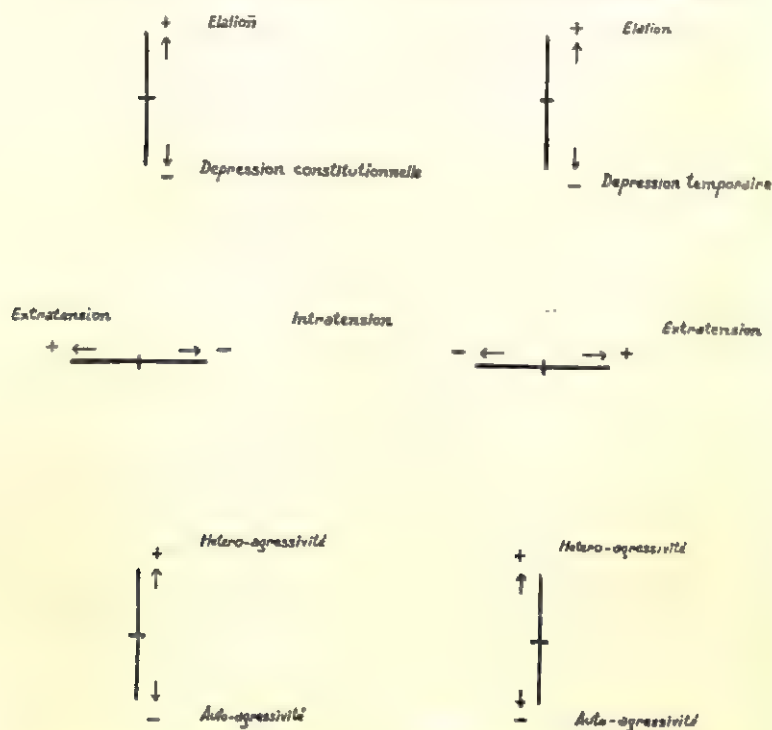
A strongly positive left sagittal P.D., accompanied by a normal or negative right sagittal P.D., indicates that the subject has tight control over an aggressive temperament. Inversely, when the right sagittal P.D. is much larger than that of the left hand, it indicates that the subject has little

# Figure 16 LINEOGRAMS

## Meaning of the Primary Deviations

LEFT HAND—TEMPERAMENT

RIGHT HAND—CHARACTER



constitutional aggression, but became overly aggressive at this time. When the P.D. of both hands is negative, a strong tendency toward intra-aggression exists which may suggest a suicidal subject.

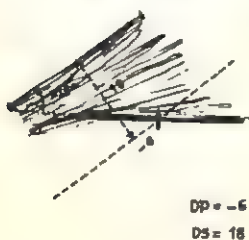
The P.D. of vertical lineograms indicates psychomotor tonicity. Subjects with weak psychomotor tonicity tend to submit to gravity except in cases where they compensate



### Figure 17 LINEOGRAMS

Measurement of Primary and Secondary Deviations (DP and DS) with Axial Deviation

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



with an acceleration of their final movements. Falling or downward vertical drawings show a negative primary deviation (Figure 17).

When the left vertical P.D. is normal or positive, while the right vertical P.D. is negative, it indicates that the temperamental psychomotor genotypic tone is good, but the subject is momentarily tired or depressed. If, on the contrary, the left vertical P.D. is negative and the right P.D. positive, it indicates a temporary, compensating reaction of the subject against a psychomotor tone which is usually insufficient. Naturally, final conclusions are never based on the result of a single drawing, but rather on the indications of the predominant average of all of the homologous drawings.

*Special Cases:* Usually, when the subject starts to deviate from the model, he will persist in this direction, and tend to increase the separation as he continues the execution of the drafts. Yet, in some cases the deviation is spontaneously corrected during the execution of the drafts.



This is observed in unstable, indecisive subjects, who lack orientation and definite character structure. This anomaly appears in more than one draft and must be noted because it furnishes unmeasurable qualitative data.

At other times the subject may lose the axis of the movement and instead of keeping parallel to the model line, form an angle with it. The more this axial deviation is accentuated, the greater its pathologic value. One measures the angle formed by the model line and the most deviated line of the draft. When this angle reaches  $15^{\circ}$ , we have to trace a parallel to the most deviated line and measure both its primary and secondary deviation (Figure 17).

When there is an axial deviation for only two or three movements which is spontaneously corrected, it may be attributed to a momentary distraction. Axial deviation is more frequent in the horizontal left sagittal lineogram and indicates schizothymia or disorientation. This deviation is especially common in children and schizophrenics.

An initial trembling which is corrected rapidly as the test progresses, is frequently observed in hypermotor subjects. If trembling persists throughout the test it may be caused by a hereditary tremor, by a symptomatic trembling of intoxication, or by a nervous affliction.

Excessive pressure of the pencil may be due to the intention of the subject to make a furrow in the paper to guide him, and therefore to very strong aggressiveness. Inversely, lack of pressure can be due to fear of the test or to a sensitive temperament.

### Figure 18 LINEOGRAMS

#### Measurement of the Secondary Deviation (DS)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



#### SECONDARY DEVIATION (S.D.)

*Measurement* (Figure 18): The secondary deviation is obtained by measuring the distance from the center of the last line done by the subject to the model line. This deviation reveals involuntary displacement of the hand perpendicular to the principal axis of the movement.

The examiner takes the S.D. for the six lineograms and then calculates the arithmetical average of the secondary deviations for each hand. Recent studies by Tito Aviles, cited in the bibliography of this volume, show that the meaning of this secondary deviation is useful, and it will be necessary in the near future to denote positive and negative values as is done with primary deviations.

*Interpretation:* Constitutional emotivity is expressed by the average S.D. of the left hand, and its control by that of the right, the dominant hand. When the average S.D. for the right hand (conscious) is larger than the average for the left hand, a state of transitory hyperemotivity

## Figure 19 LINEOGRAMS

Measurement of the Secondary Deviation (DS) in Special Cases

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



$DS = 12$

(a)



$DS = 7$

(b)



$DS = 11,5$

(c)

(which can be caused by temporary conflicts) is indicated. The more pronounced S.D. generally occurs in the left vertical lineograms. If a positive or negative value is given to the secondary deviations of each hand, the data of the primary deviations can evidently be confirmed or corrected by comparing the meaning and intensity of these deviations with the meaning and intensity of the S.D. which corresponds to the perpendicular planes.

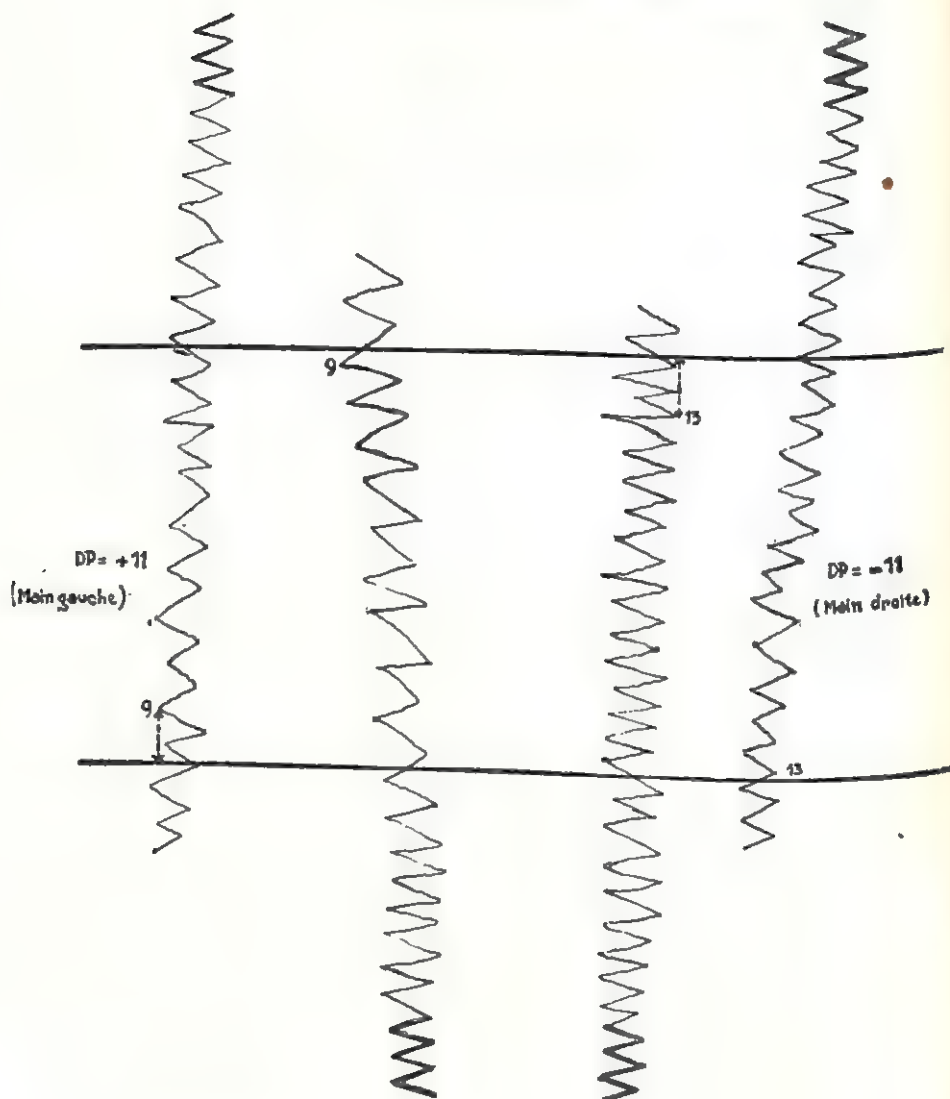
*Special Cases:* In certain cases, the subject who has moved to one side of the model line returns (by a phenomenon of auto-compensation) to this line and goes beyond it to the other side. In such cases we measure the S.D. on the side where the deviation is more marked (Figure 19a). When the subject goes more or less equally from one side to the other, we establish an average (Figure 19b).

Some subjects make a sudden movement at the end of the execution of a draft, producing a large S.D. Since such swerving is usually accidental, in order to avoid undue penalty an average of two measurements is obtained for • the secondary deviation (Figure 19c). First we obtain the secondary deviation for the line from which the large sudden movement originates; then we obtain the secondary deviation for the line produced by the sudden movement; and, finally, we average the two measurements.

In other cases, where the S.D. does not parallel the model line, we proceed as in cases of axial torsion of lineograms, that is, a line parallel to the model line is traced. This type of torsion is frequent in children and depressed adults.

### ZIG-ZAGS

The zig-zags indicate the degree of tensional equilibrium of the subject and reveal the fineness and precision of his movements. All measurements for zig-zag are taken in the zone between the two horizontal lines printed in the center of the test page. Qualitative judgments, however, are derived from zig-zags drawn on the entire page. The zig-zag provides more information than any of the other subtests and is the one which indicates the attitudinal makeup of the subject. The productivity of the zig-zags may be due to the great amount of data obtained, or perhaps because it is the only part of the test where we can observe expressive movements done with both hands at the same time.



Key

DP: Primary Deviation

main gauche: left hand

main droite: right hand

*Figure 20* ZIG-ZAGS

## Measurement of the Primary Deviation

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

---

The following measurements are made for the zig-zag:

- (1) Primary Deviation (P.D.)
- (2) Length of Lines (L)
- (3) Dimension of Angles (Ang.)
- (4) Axial Deviation (A.D.)

## PRIMARY DEVIATION (P.D.)

*Measurement* (Figure 20): The primary deviation expresses the difference between the egocifugal draft and the egocipetal draft of the same hand, requiring a primary deviation computation for each hand. We count the number of angles (the lateral apexes) of the egocifugal and egocipetal zig-zags of the right hand. If the number of angles is the same in the two movements, the primary deviation is equal to zero. When the number of angles is not the same, we count off in the zig-zag with more angles (going in the direction of the movement) a number of angles equal to that of the lesser series. We check the lateral apex of the last full angle, then mark the lateral apex of *the angle that follows* with a dot. The examiner measures (in millimeters) the perpendicular from this dot to the printed horizontal line toward which the movement was directed. This figure, the primary deviation, reveals the predominance of egocifugal tendency or egocipetal



tendency for the right hand. The same procedure is followed for the left hand. The P.D. is positive when it expresses an egocifugal predominance (fewer zig-zags away from than toward the body); it is negative when there is an egocipetal predominance (more angles away from the body).

*Interpretation:* Since the zig-zags are all drawn in a sagittal plane, the P.D. indicates (as in sagittal lineograms) the subject's aggressiveness. Most normal subjects advance with prudence, producing a slightly negative P.D.

Comparative work done among Indians, homicidal individuals, and normal adults has indicated that the average value of aggressiveness of the criminal group was nearer that of the primitive Indians, than that of the normal adults. However, on the zig-zag, scores for the criminal group more closely approach those of the civilized group. From this study, one may speculate that a positive P.D. in the zig-zag indicates exceptionally controlled and balanced movements.

#### LENGTH OF LINES (L)

*Measurement* (Figure 21): The shortest and longest lines within each of the four zig-zag drawings are measured in millimeters. The difference between them is the *linear difference*. The measurement is confined to the angles within the two horizontal lines.

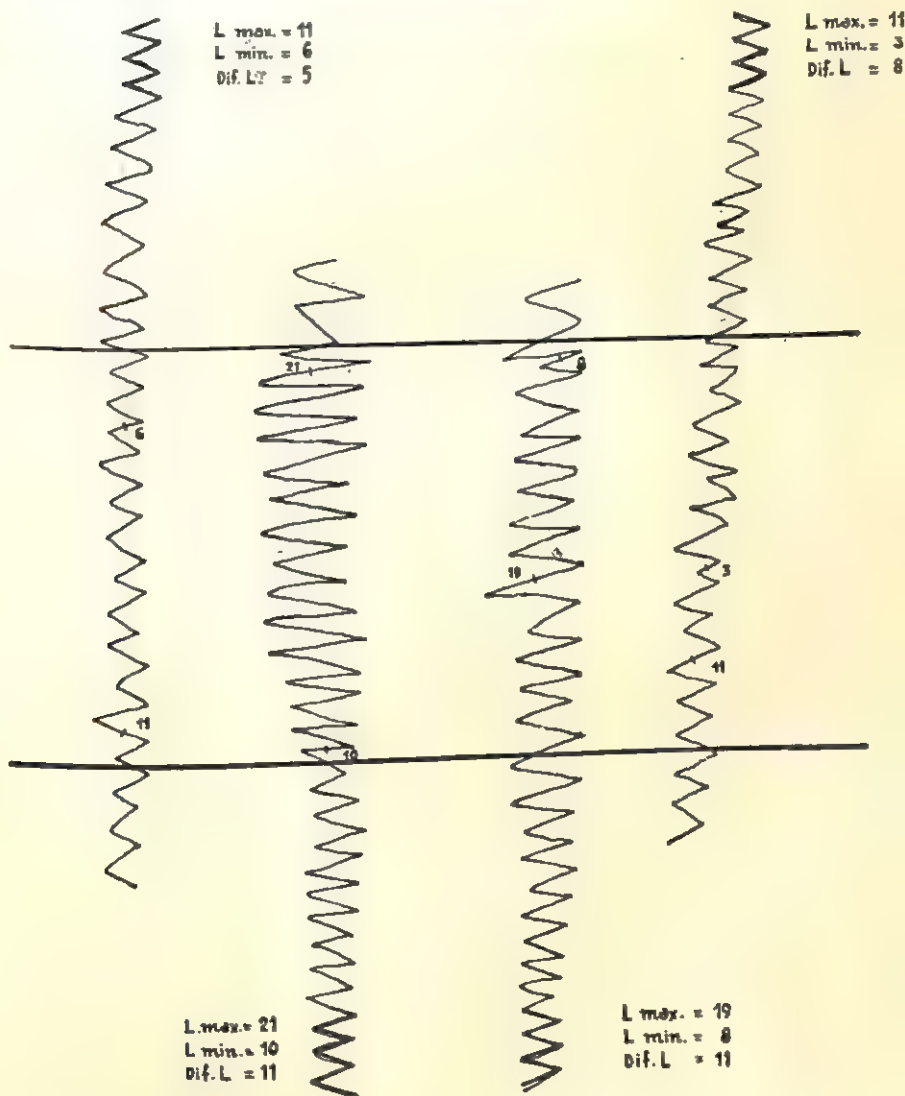
*Interpretation:* The sides of the model angle are 10 mm. each, and subjects tend to increase or to diminish this length. The tendency to increase, when confirmed by the rest of the M.K.P., indicates a state of excitation. Diminution or decrease indicates inhibition. The linear difference reveals the variation between these two states. A linear



Figure 21 ZIG-ZAGS

Measurement of Length

Note: The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



difference greater than 16 mm. is considered abnormal. A difference of less than 4 mm. denotes personalities with good control of muscular movements and emotional tension.

Often there is a progressive increase of the linear length, a phenomenon of motor induction (heating) which is characteristic of anxiety states.

#### DIMENSION OF ANGLES (ANG.)

*Measurement* (Figure 22): Three measures in degrees are obtained for each zig-zag: maximum, or largest angle; minimum, or smallest angle; and the difference between these two. We always measure the angles whose apexes are toward the outside of the page.

Angles with curved sides are measured as if their sides were perfectly straight.

*Interpretation:* A constant increase of the angles from the model angle of  $30^{\circ}$  reflects a predominance of the muscular group which directs this movement; diminution indicates predominance of the antagonistic group. The regularity or irregularity of the angles has the same significance it does for lineograms, that is, it reflects "nervous equilibrium." A large angular difference indicates lack of control, an impulsiveness capable of producing large or small behavior outbursts.

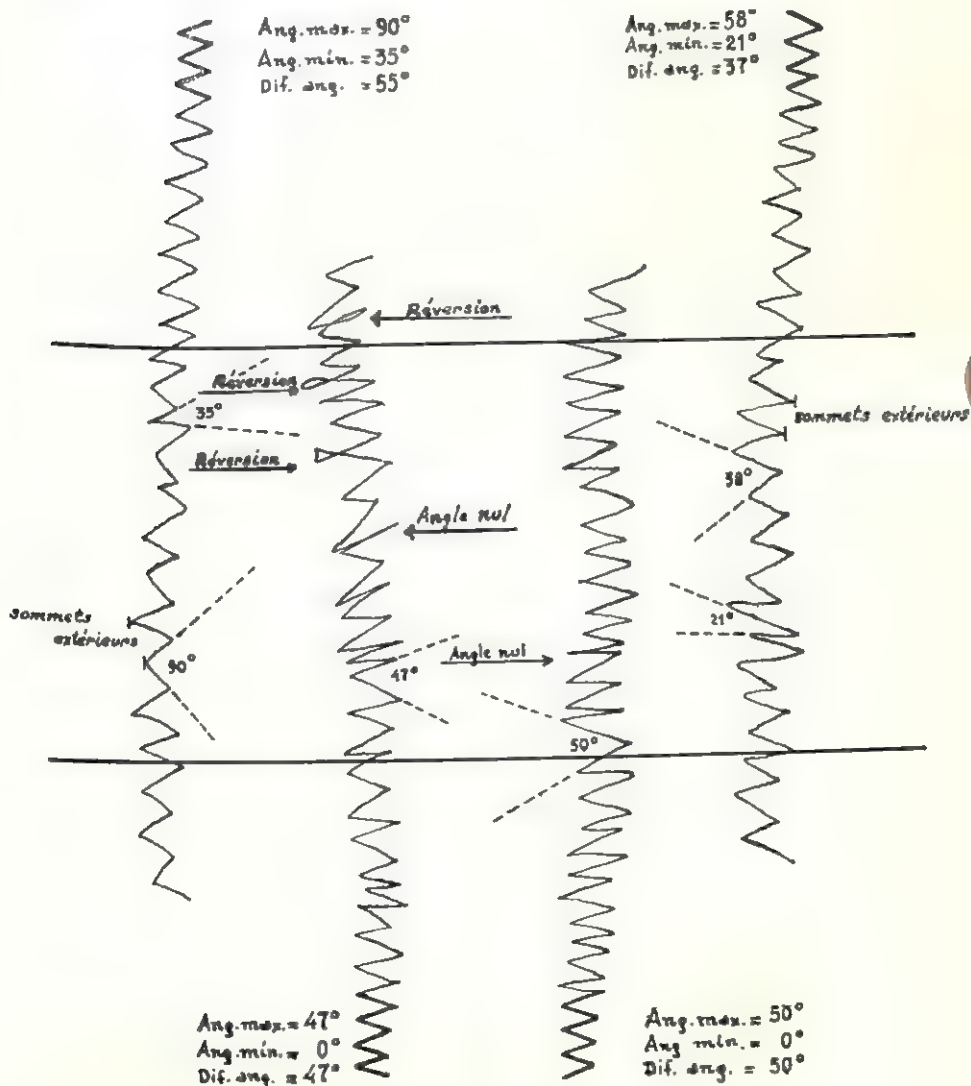
*Special Cases:* Very often when the flexion tendency is stronger than that of extension, the subject loses his initial push, and upon arriving at the end of the zig-zag, he executes a backward flexor movement, tracing back over the preceding angle. This phenomenon is called "reversion" (Figure 22) and indicates a pathologic state (tensional ambivalence). This is especially true when reversion

Figure 22 ZIG-ZAGS Measurement of Angles

Key

Angle nul: Null Angle

Sommets extérieurs: Lateral apexes



is accompanied by other signs such as the loss of the model configuration. Reversion can also be found in the ego-cipetal zig-zag if the extensor movement excessively dominates the flexor movement. This is interpreted to mean that the subject unconsciously resists the pressures of his environment.

When reversions occur at the beginning of the zig-zag draft and are repeated as the subject continues, the pathological indication is accentuated. This sign does not have as much value among adolescents as for adults, for it corresponds to a kind of dissociation or schizoid maneuver in keeping with that age, i.e., a mental synthesis which changes at every moment, and destroys regularity and praxic unity. This period of apparent contradiction explains the characteristic affective irritability and *anguish*<sup>6</sup> of adolescents. It is interesting to note that in 80 per cent of the cases where an exaggeration of reversion in the zig-zag was observed, a disturbance of behavior was validated by clinical and social examinations.

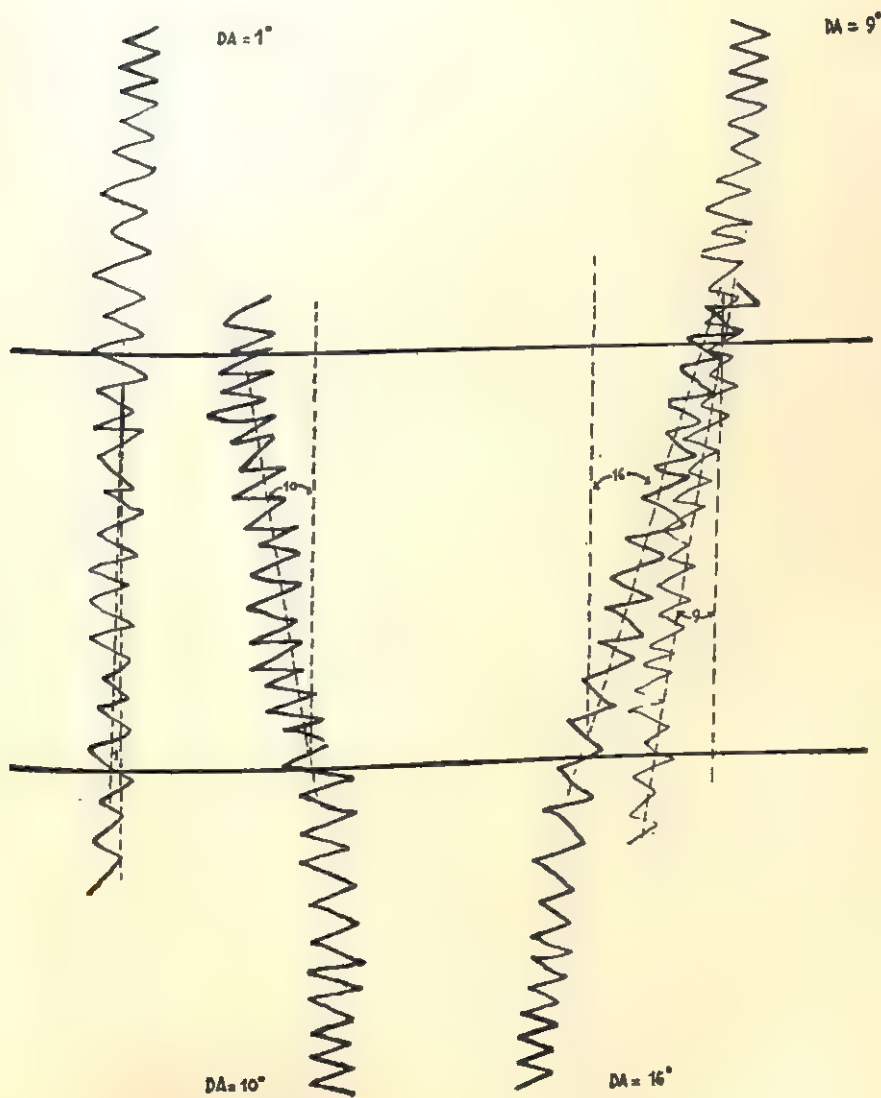
Asthenic or timid subjects often form null angles (Figure 22) toward the end of the draft. An angle is considered null when its two sides are superimposed over more than one-third of their length.

For statistical purposes, every reversion is assigned a value of  $-5^{\circ}$ , and the null angle  $0^{\circ}$ . It is evident that the significance of reversions and null angles greatly exceeds the numerical value of these statistical representations, and that these angles must be considered qualitatively rather than quantitatively.

<sup>6</sup> See footnote 5, page 40.

Figure 23 ZIG-ZAGS

Measurement of Axial Deviation (DA)



## AXIAL DEVIATION (A.D.)

*Measurement* (Figure 23): The zig-zag pattern drawn by the subject forms an angle with the pattern which would result from an accurate prolongation of the model. This is measured in the following way:

(1) A straight sagittal line is drawn, parallel to the axis of the model pattern, but beginning at the *center* of the *first* line drawn inside the measuring zone. This line represents the axis of the model pattern had it been accurately prolonged.

(2) A straight line is drawn from the center of the first line to the center of the last line drawn within the measuring zone. This line represents the axis of the pattern actually drawn by the subject.

The apex of the angle to be measured will then be at the center of the first line drawn within the measuring zone. Four such angles are measured, two for each hand.

*Interpretation:* Most subjects will show a deviation, especially of the egocifugal zig-zag draft. A pronounced axial deviation indicates a lack of compensation of muscular tensions.

Introverted individuals tend to close the zig-zags and even to intersect them. Extroverted subjects, on the contrary, draw the zig-zags toward the outside.

*Special Cases:* Certain subjects will lose their sense of direction and change their axis many times—axial torsion indicating psychomotor pathology. When this happens only once, the subject may be absent-minded or have changed position during the execution of the draft.

Sometimes a disorganization in the forms of the zig-zag is observed which results in confused drawings of different

dimensions and directions. This is called "loss of original configuration" and is pathologically significant. The possibility of an axial deviation produced by labyrinthic difficulties should be kept in mind, and, when suspected, the subject should undergo appropriate neurological tests.

Where marked loss of "muscular" configuration occurs, it may be impossible to measure the drawings, but obviously, under these conditions, their qualitative significance is sufficiently revealing.

#### OBSERVATIONS

Because the zig-zag is difficult to draw, most people feel slightly worried at the onset of the test, and therefore tend to reduce the size of the drawing as soon as they are deprived of visual control. This may explain the fact that the primary deviation is normally negative in this test whereas it is positive in the sagittal lineograms.

The zig-zag also reveals the dominant hand—that is, which cerebral hemisphere most controls the subject's conduct. (Naturally, this hemisphere is on the opposite side from the dominant hand.) The dominant hand usually moves faster and with greater strength than the recessive hand, which tends to lag.

The zig-zag and the stairs offer the best evaluation of the subject's intelligence, as shown by the Grompone studies (described in Chapter 5).

#### STAIRS

This part of the test, which serves as an additional check on data already obtained by the vertical lineograms, pro-



# Figure 24 STAIRS

## Measurement of Primary Deviation (DP)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

### Key

*Sommets extérieurs:* Lateral apexes

*Sommets intérieurs:* Medial apexes

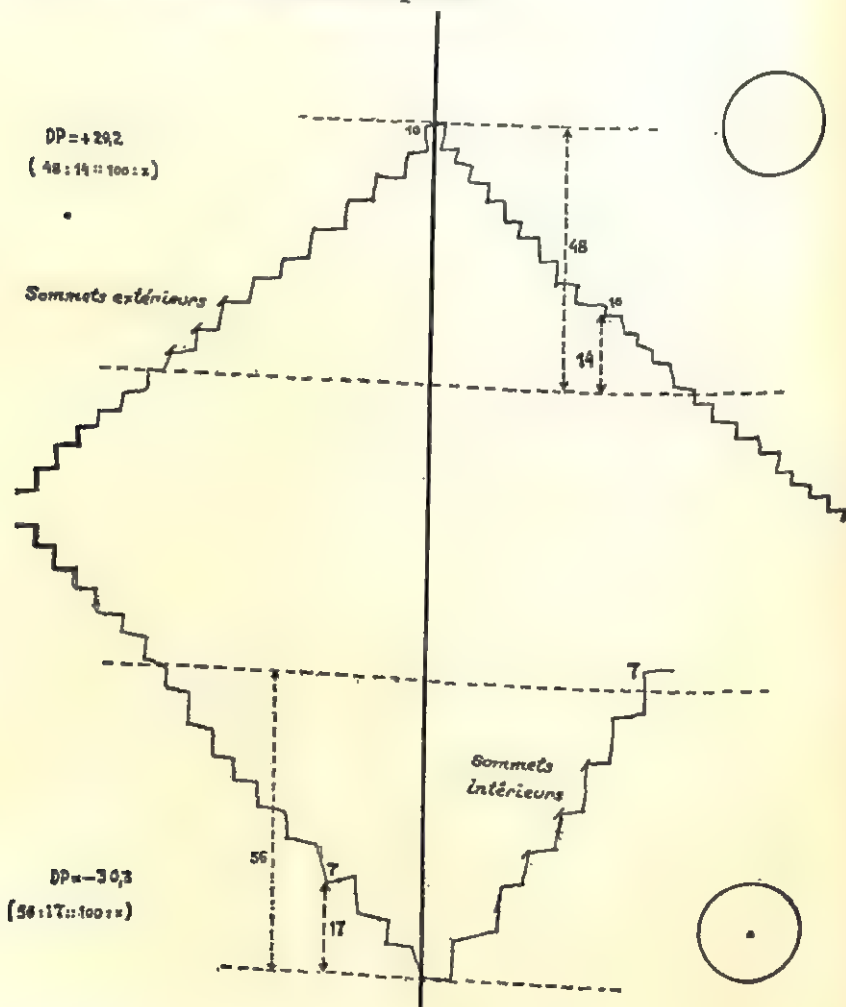
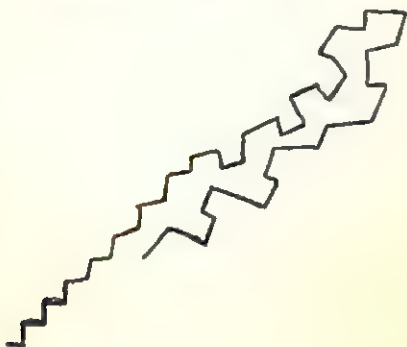


Figure 25 STAIRS

## A Greek Key



vides a general idea of the subject's intelligence. Only one quantitative datum is needed, the primary deviation.

## PRIMARY DEVIATION (P.D.)

*Measurement* (Figure 24): We trace a horizontal line that passes through the third of the ascending steps drawn with visual control until it crosses the descending steps.

From this line, the number of steps are counted, first on one side, then on the other, that lead to the top of the stairs. Each step consists of two movements or two lines.<sup>7</sup>

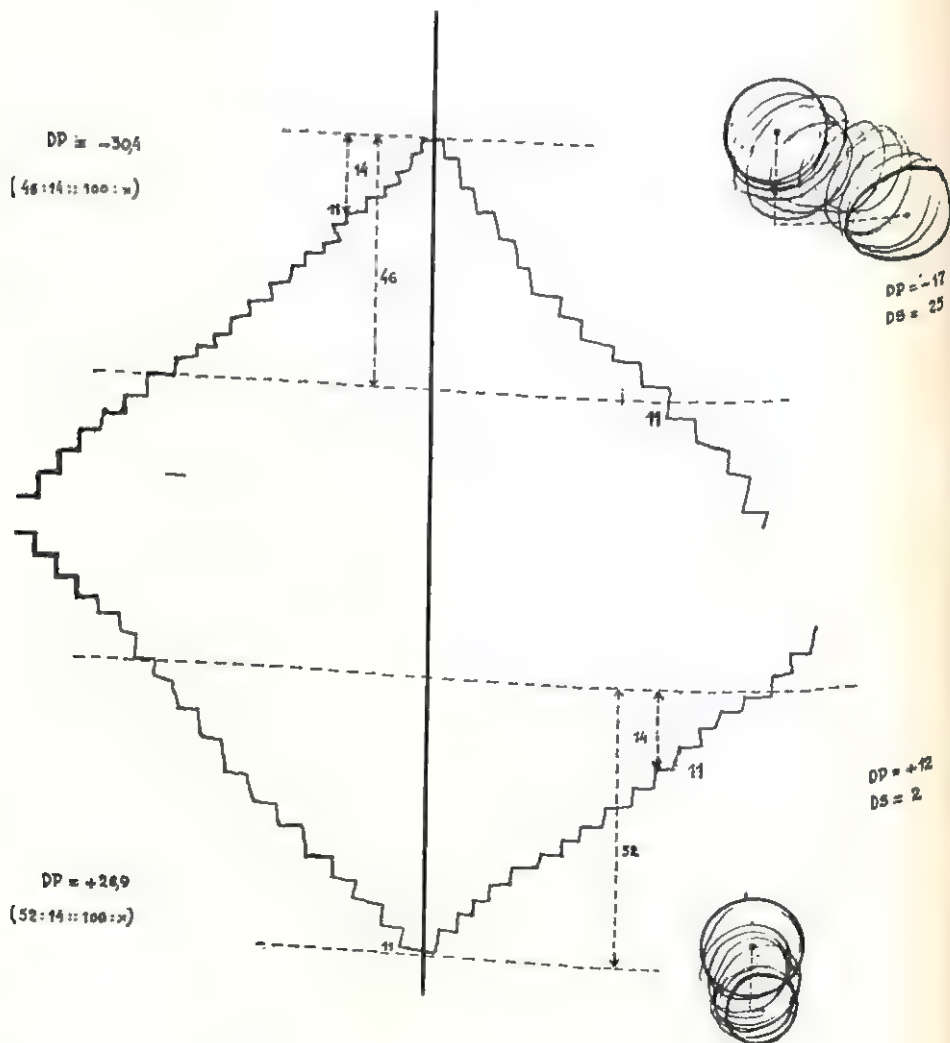
On the side with the greater number, a number of steps are counted off equal to that on the lesser side. (The count is started from the top of the stairs when the descending series has the greater number, and from the bottom when the ascending series is greater.)

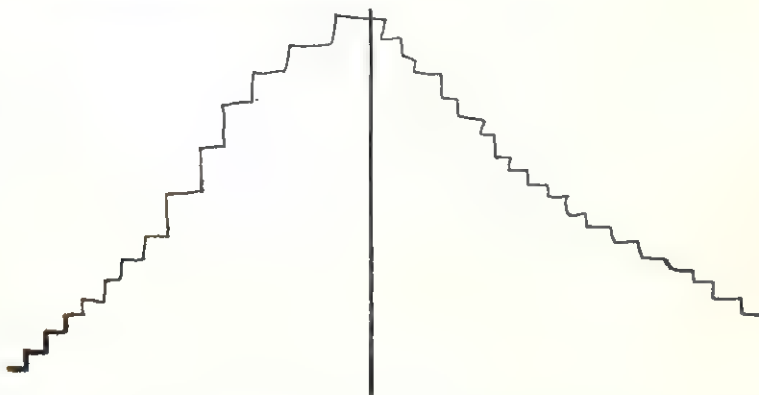
<sup>7</sup> Even if the subject draws a Greek key (Figure 25) it is counted in the same way, e.g., each two lines or two movements is considered a step.

Figure 26 STAIRS AND CIRCLES

Synthesis of Measurements

Note: The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



**Figure 27 STAIRS****An Example of Hyper-Motor Tension**

From the center of the horizontal line of the following step, the examiner drops a perpendicular to the horizontal line which passes either through the summit of the stairs when the ascending series is greater—or through the bottom rung when it is smaller (Figure 26). The distance measured along the perpendicular joining these two points is the primary deviation.

To standardize measurements, the established procedure is to measure the stairs within a band of 10 cm. When the deviation exceeds or falls short of 10 cm. (which almost always happens) it is necessary to derive its proportion in relation to 100 mm. If the drawing tends to vary greatly from the original, we count each *two movements* as a step, regardless of direction.

The P.D. is negative when there are fewer ascending steps, and positive when there are fewer descending steps.

*Interpretation:* A positive primary deviation indicates

good psychomotor tension; a negative P.D. indicates depression, since the subject accelerates his movements in the direction of gravity.

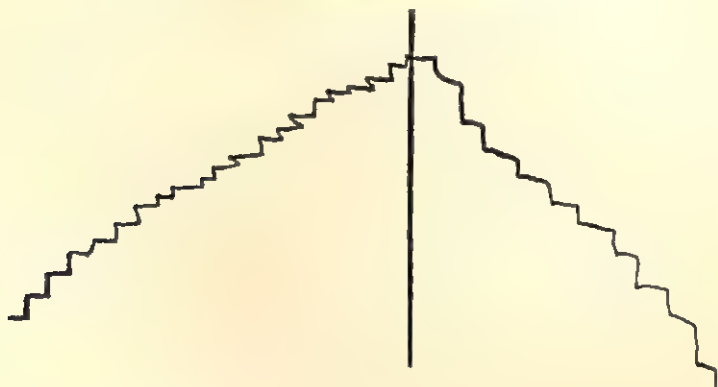
Some individuals with mild depression draw the ascending series with great rapidity and the draft fails to show a negative P.D. A classic example of hyper-motor tension is shown in Figure 27; lack of psychomotor tension is shown in Figure 28.

When the general drawing of the stairs is well integrated, it indicates good intellectual level and mental stability. On the other hand, intellectually inferior subjects, or those with psychological deficit, tend to draw the descending branch of the stairs back along the same side as the ascending branch despite the verbal and graphic instructions that precede the test. They may also convert right angles into acute angles (Figure 29) or draw the stairs in Greek key formation (Figure 25). When the subject loses controlled integration of his movements, the

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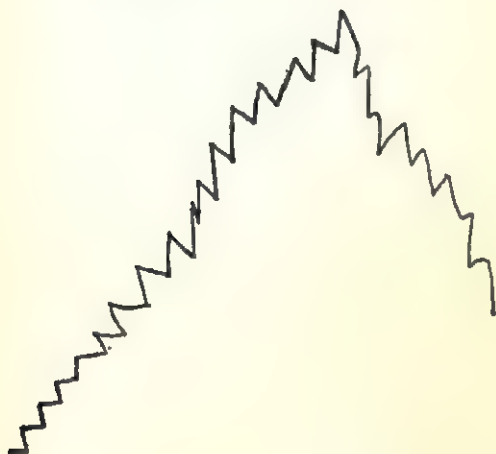
*Figure 28* STAIRS

An Example of Lack of Psychomotor Tension



# Figure 29 STAIRS

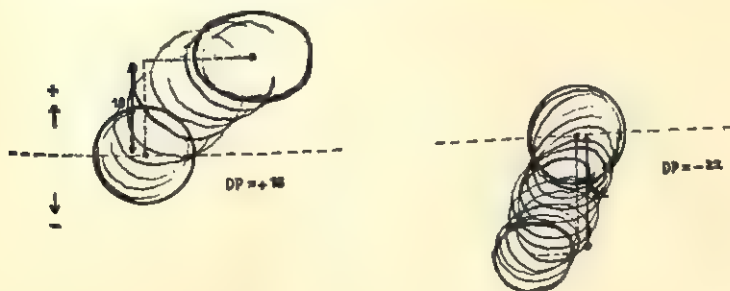
An Example of Intellectual Deficit



# Figure 30 CIRCLES

Measurement of Primary Deviation (DP)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



drawing becomes a scrawl; this denotes a serious pathological state.

Obsessive personalities can be detected by the scrupulousness and regularity with which they draw each step. Their movements are precise, usually smaller than the pattern, and not rotated.

## CIRCLES

Measures to be considered are:

- (1) Primary Deviation (P.D.)
- (2) Secondary Deviation (S.D.)

### PRIMARY DEVIATION (P.D.)

*Measurement* (Figures 26 and 30): The primary deviation is the vertical distance between the center of the standard circle and the projection (on its axis) of the center of the tenth circle drawn without visual control. The P.D. is positive if the center of the tenth circle is higher than that of the standard; it is negative in the opposite case.

*Interpretation:* The circles are drawn in a vertical plane, like the stairs, and they indicate the degree of psychomotor tension.

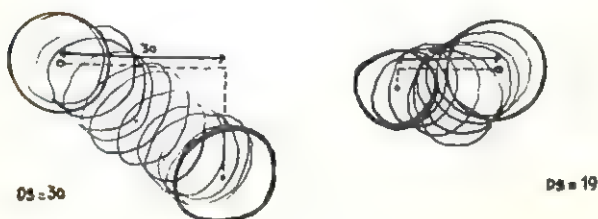
A drop in the drawings usually is a sign of introversion; a rise indicates extroversion. When anxiety is present, there is a tendency, as in the zig-zag, to gradually expand the circles; with inhibition, there is constant diminution of the circles.



*Figure 31* CIRCLES

## Measurement of Secondary Deviation (DS)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



Epileptics make abrupt changes in diameter. Schizothymics show complete inability to draw figures and convert the circles into polygons.

## SECONDARY DEVIATION (S.D.)

*Measurement* (Figure 31): The secondary deviation is the horizontal distance between the center of the standard circle and the projection of the tenth circle drawn without visual control.

*Interpretation:* The secondary deviation expresses the subject's emotivity. The S.D. is quite pronounced in hysterics.

Figure 32 CHAINS

Measurement of Primary Deviation (DP)

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

---

CHAINS

Four groups of chains are considered separately:

- (1) The right egocifugal sagittal chain and the right egocipetal chain.
- (2) The two left sagittal chains, egocifugal and egocipetal.
- (3) The two right vertical chains, ascending and descending.
- (4) The two left vertical chains, ascending and descending.

For each of these groups the following measurements are taken:

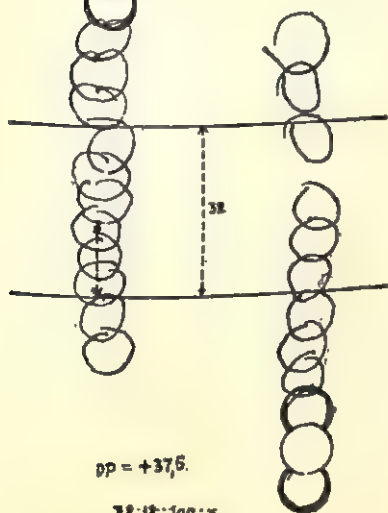
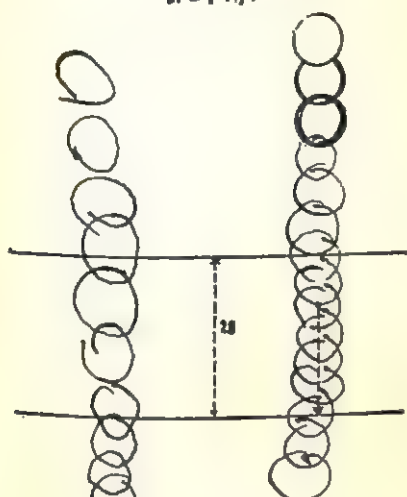
- (1) Primary Deviation (P.D.)
- (2) Axial Deviation (A.D.)

PRIMARY DEVIATION (P.D.)

*Measurement* (Figure 32): The primary deviation is calculated by a process similar to that used for the zig-zag and the stairs. All measurements are taken within a band formed by two horizontal lines. One horizontal line passes through the outer rim of the third link drawn with visual

28:20::100:x

$$DP = +71,4$$

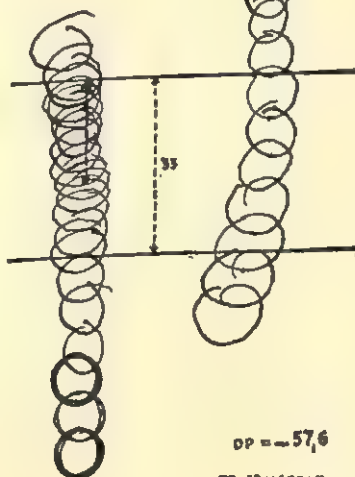
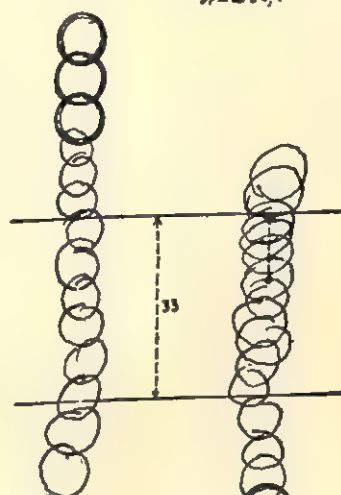


$$DP = +37,6$$

32:12::100:x

33:12::100:x

$$DP = -36,4$$



$$DP = -57,6$$

33:10::100:x

control in the egocifugal direction; the other passes through the outer rim of the third link drawn with visual control in the opposite direction.

Within the limits of this band we count the number of links drawn in the outward direction and the number drawn inward. A ring is considered within the band when its center is included in it. If the number of links is equal for both chains, the P.D. is zero. If these numbers differ, the number in the lesser chain is subtracted from the more numerous chain.

The center of the last ring thus determined is marked. From this point we drop a perpendicular to the horizontal line toward which the chain is directed. The length of the perpendicular, computed proportionally in relation to a standard transversal line of 10 cm., measures the primary deviation (Figure 32). The P.D. is positive for chains drawn in both the sagittal and vertical planes when the number of links in the ascending (egocifugal) chain is smaller, and negative otherwise.

*Interpretation:* The sagittal chains offer an additional check on the findings determined by the lineograms and zig-zags. They reveal, better than any other movement, the subject's aggressiveness. In addition to quantitative data, the chains can be interpreted qualitatively—for example, when the chain is broken or the links are lumped together. In cases of strong outward aggression, the subject, in moving away from his body, breaks the chain so that the rings are not interlocked as in the standard. Conversely, egocifugal lumping occurs with lack of impetus; the subject keeps retracing the same link or even retreats so that the final result turns into an undifferentiated cluster instead of a chain. The reverse interpretation should be given when this occurs with the egocipetal chains. When

one observes a rather normal egocifugal chain and an egocipetal chain which stops in the middle of its course, so that the subject does not succeed in getting near his body, it is almost certain that the drawing has been produced by an individual whose self-criticism is almost non-existent and who is frequently "stubborn."

The vertical chains verify data regarding the subject's drive obtained by the lineograms, stairs, and circles.

### *Special Cases*

The following observations also may be made:

*Degree of closure of the links:* Two variations may occur. A subject may finish tracing the link without returning to the starting point, that is, the link remains open; this is interpreted as disinterest in achievement. Or, the subject may return to and overlap the starting point—an indication of excessive precaution or perseverance (Figure 33).

*Relation between the initial and final size of links:* When the size of each link gradually increases, a state of anxiety may be assumed; in the opposite case, a state of *anguish*<sup>8</sup> (Figure 34).

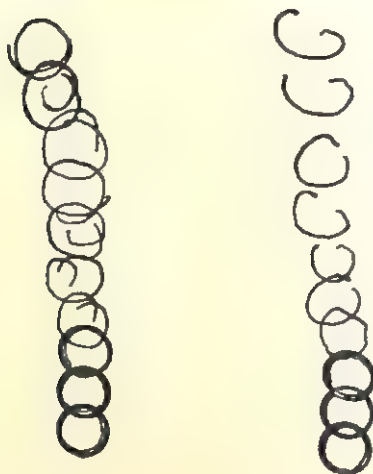
*Abrupt changes in diameter:* Such changes are characteristic of explosive personalities, especially epileptics (Figure 35).

*Shape of links:* The links may be circular like the standard, or angular like a polygon. When found in left-hand drawings, round links suggest a cyclothymic tendency; angular links suggest a schizothymic tendency (Figure 36).

<sup>8</sup> See footnote 5, page 40.

**Figure 33 CHAINS**

Degree of Closure of Links



**Figure 34 CHAINS**

Relation Between Initial and Final Size of Links

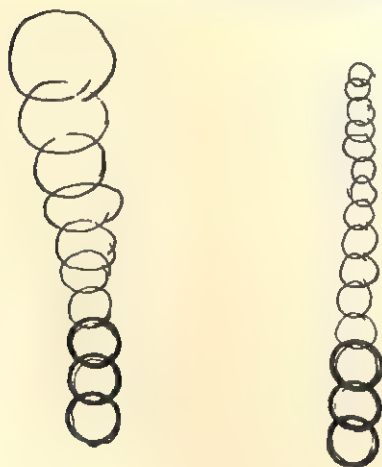


Figure 35 CHAINS

Abrupt Changes in Diameter of Links

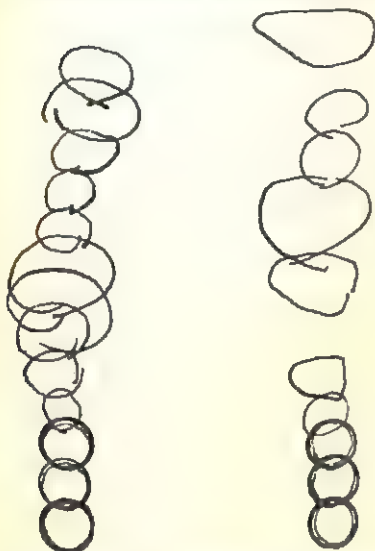
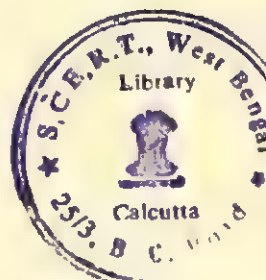
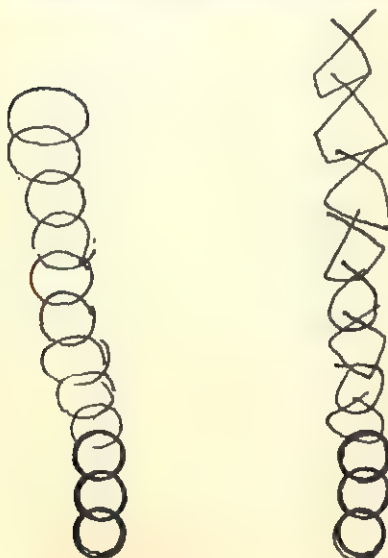


Figure 36 CHAINS Shape of Links





### AXIAL DEVIATION (A.D.)

*Measurement* (Figure 37): Each chain is measured separately.

We mark a point in the center of the first link (within the horizontal band), counting the links in the direction in which the chain is drawn.

From this point a perpendicular is drawn to the more distant horizontal line.

We then mark off the center of the last link included within the horizontal band, and draw a straight line from the center of the first link to that of the last within the band.

The angle thus formed is measured to obtain the axial deviation (see Figures 37 and 38).

*Interpretation:* The axial deviation of the chains has the same meaning as that of the zig-zags. When axial torsion occurs, it should be measured as it is in the zig-zag. Such drawings are usually of pathological significance and may be attributed to immaturity, regression, or muscular dissociation: the subject has not succeeded in establishing an axis for his movements.

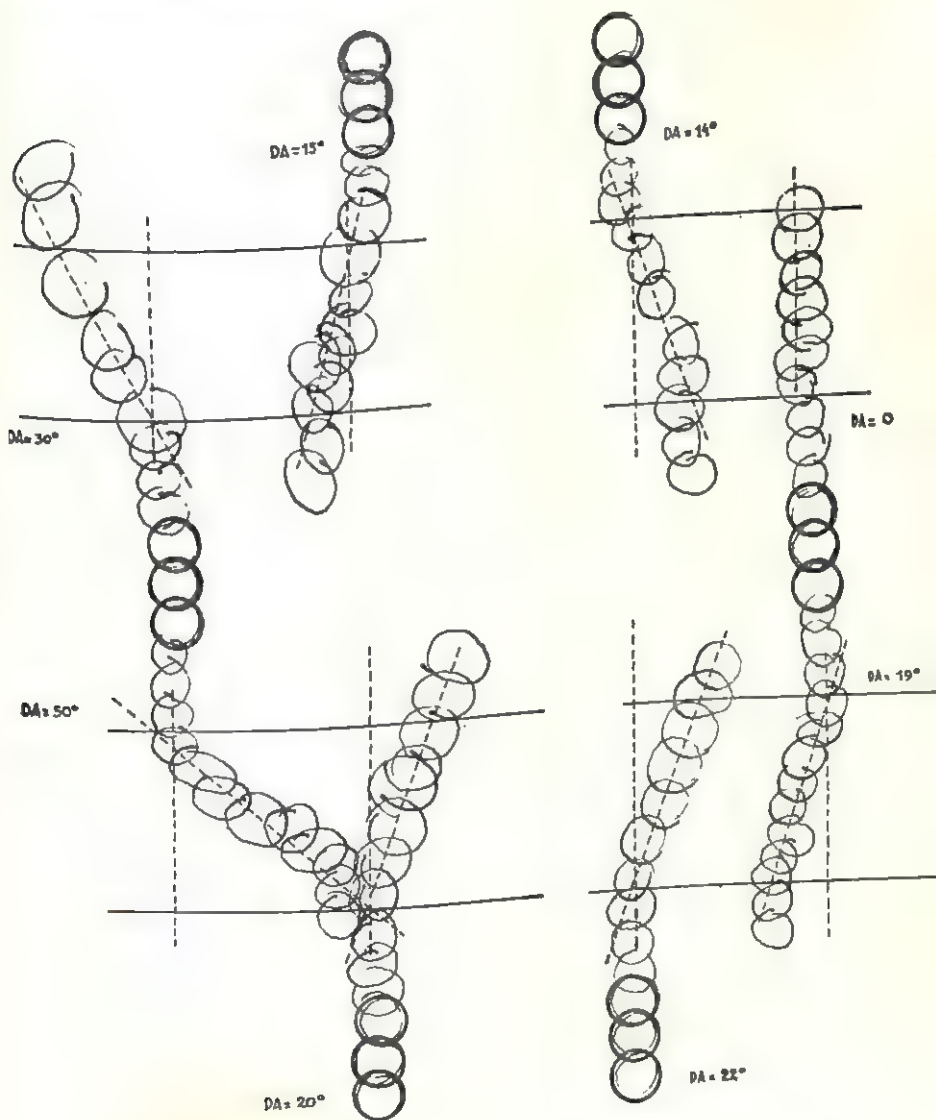
### PARALLELS

The following data are obtained:

- (1) Primary Deviation (P.D.)
- (2) Axial Deviation (A.D.)
- (3) Linear Length (L)

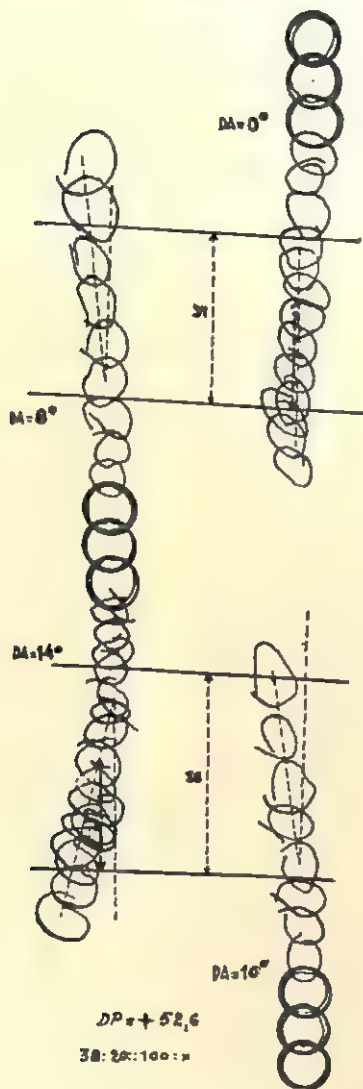
Figure 37 CHAINS

Measurement of Axial Deviation (DA)



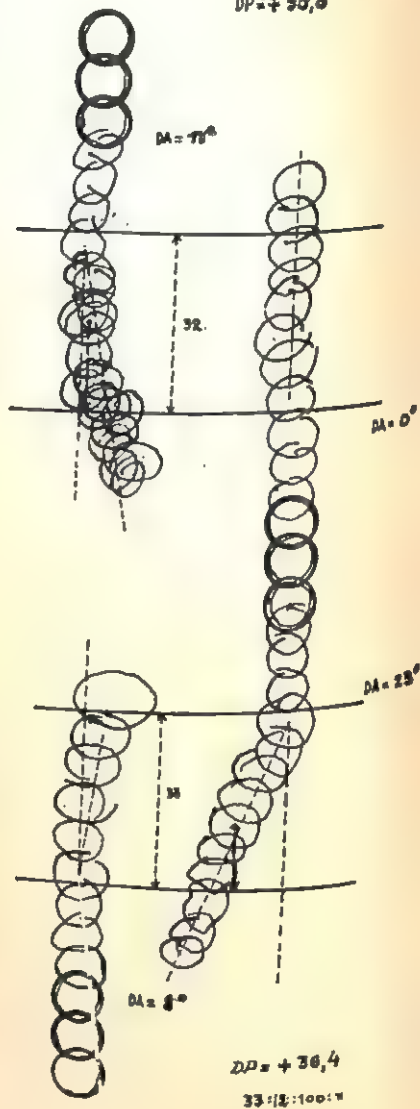
31:17::100:x

DP = +54,8



32:16::100:x

DP = +50,0



## Figure 38 CHAINS

### Synthesis of Measurements

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

---

### PRIMARY DEVIATION (P.D.)

*Measurement* (Figures 39 and 40): Measurements are obtained by comparing the egocifugal and egocipetal parallels drawn by the same hand.

For each series, we draw two parallel lines—one directly above the third parallel drawn with visual control and the second at a distance of 10 cm. from the first. Once this 10 cm. band has been determined, we count separately for each, the lines drawn by the subject in the egocifugal and egocipetal drawings. We then subtract from the drawing with the greater number of lines the number of parallels in the other drawing. A line is considered as inside the band when at least half its length is inside.

We mark a point in the center of the following parallel, and measure the perpendicular distance that separates this point from the 10 cm. band toward which the draft is directed.

This distance represents the primary deviation. It indicates difference of tension between movements of flexion and extension of the arm. The primary deviation is positive when extension dominates; that is, when there are fewer lines within the egocifugal band. It is negative in the opposite case.

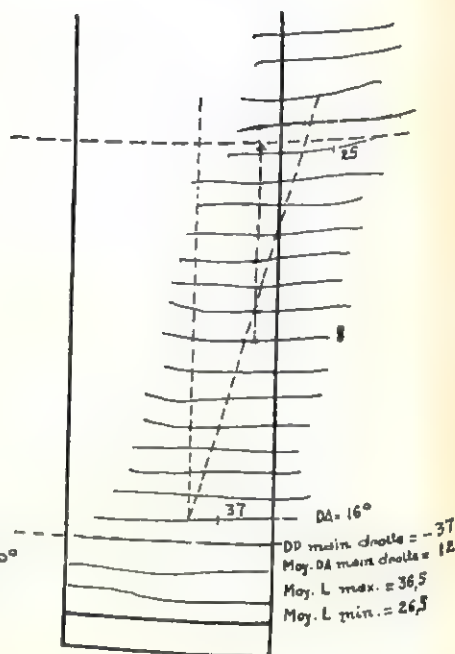
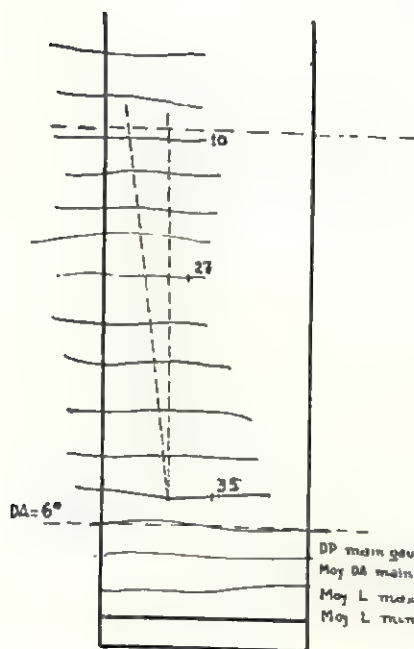
If the cluster of parallels is too close to permit measur-



DP = + 15  
DS = 11



DP = - 10  
DS = 12



### Key

DP main gauche: Primary Deviation, left hand

DP main droite: Primary Deviation, right hand

Moy. DA: Average Axial Deviation

Moy. L. max.: Average maximum length

Moy. L. min.: Average minimum length

**Figure 39 SYNTHESIS OF MEASUREMENTS  
OF EGOCIFUGAL PARALLELS AND  
VERTICAL U'S**

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

ing a transversal strip of 10 cm., the P.D. is measured relative to a band of 100 mm.

*Interpretation:* The P.D. of the parallels is interpreted in the same way as that of the sagittal chains. It is slightly negative among normal individuals, and positive among overly aggressive individuals. Observations as to how the individual draws the egocifugal and egocipetal designs are often more important than actual measurements. One should note whether the subject advances regularly or erratically, whether he pauses or retraces his drawings, because subjects having the same P.D. may nevertheless exert different movements of flexion or extension.

**AXIAL DEVIATION (A.D.)**

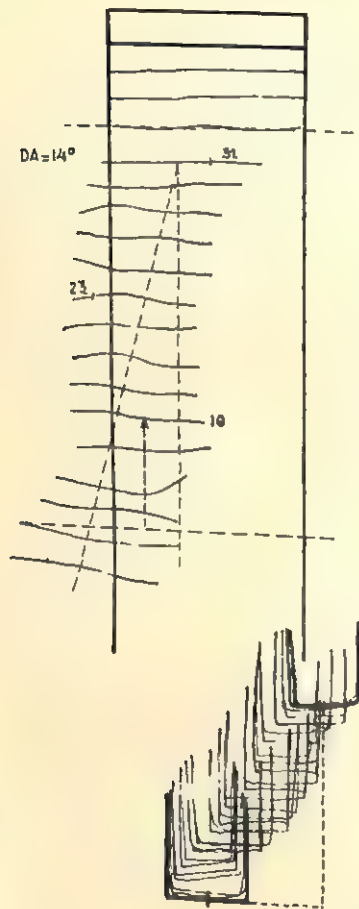
*Measurement* (Figures 39 and 40): The axial deviation represents the deviation of the subject's hand toward the left or right during execution of the drawings.

Starting in the direction that the parallels are headed, we mark the center of the first line within the band.

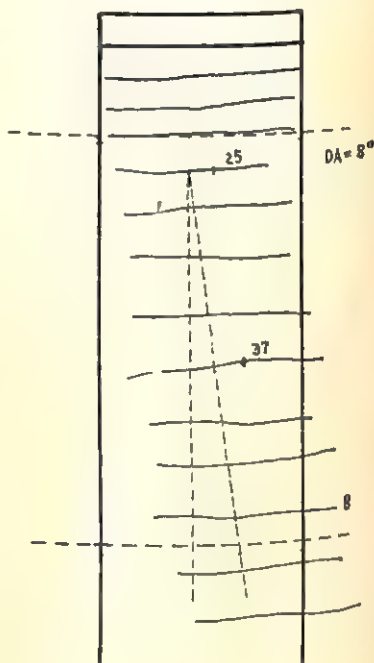
From this point a perpendicular is traced to the more distant horizontal line, and the center of the last line included in the band marked. We then join the two centers and measure the angle formed. This is the axial deviation (Figures 39-40).

**Figure 40 SYNTHESIS OF MEASUREMENTS  
OF EGOCIPETAL PARALLELS AND  
SAGITTAL U'S**

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



DP = + 38  
DS = 21,5



DP = 0  
DS = 25



*Interpretation:* Interpretation of the A.D. is analogous to that of the secondary deviations of other drawings. Nevertheless, since the subject works within the confines of given boundaries, deviation of the parallels has more significance than that of other designs. In general, among "extroverts" with a need to love others the axial deviation is directed outward, toward the end of the paper. Conversely, the axial deviation of introverts is usually directed toward the center. When axial torsion takes place, it is not possible to measure the A.D.; this occurs particularly among schizophrenics.

#### LENGTH OF LINES (L)

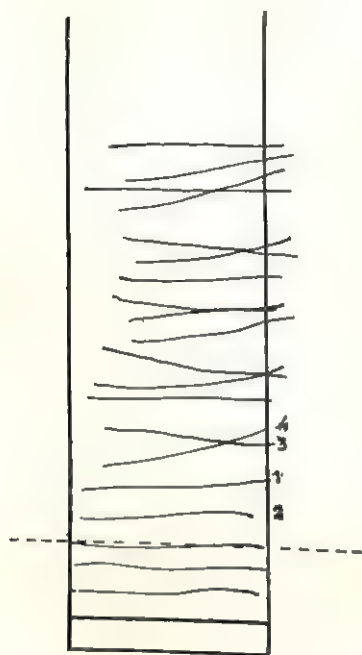
*Measurement* (Figures 39-40): The maximum and minimum egocifugal and egocipetal linear lengths drawn by both hands are measured. We then determine the difference between the maximum length and the minimum length for each hand. This difference is called linear fluctuation.

*Interpretation:* Consistent lengthening of the lines indicates a state of anxiety; diminution of the lines reveals a state of inhibition.

*Special Cases:* Frequently, when flexor impulses predominate, the subject's hand retreats instead of advancing and crosses or precedes the line just drawn, forming a cross or windmill effect. Subjects with this tendency usually exhibit similar reversions in the zig-zag. If these two effects occur frequently a prediction of severe pathology, such as schizophrenia, is warranted (Figure 41).

When the parallels deviate both toward the left and toward the right so that in joining the mid-lines a twisted

Figure 41 PARALLELS: SPECIAL CASES



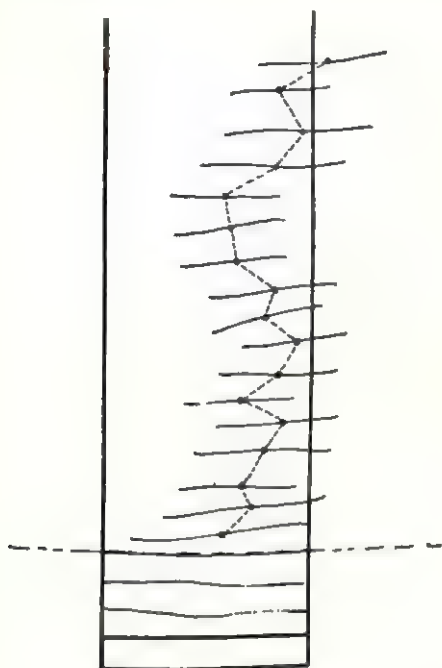
line results, giving the impression that the subject was groping as he took the test, tensional predisposition to doubt and erratic behavior may be deduced. This predisposition may be transitory or habitual, depending on whether it is observed in the dominant or subconscious hand (Figure 42).

U

For the vertical and sagittal U, two measures are taken:

- (1) Primary Deviation (P.D.)
- (2) Secondary Deviation (S.D.)

Figure 42 PARALLELS: SPECIAL CASES



### PRIMARY DEVIATION (P.D.)

*Measurement* (Figure 43): The primary deviation is measured by the perpendicular distance between the center of the horizontal branch of the tenth U drawn without visual control and the horizontal base of the standard U.

The P.D. is positive for deviations higher than the standard, and negative in the opposite case.

*Interpretation:* The P.D. in the vertical U reveals the subject's tonic; in the sagittal U it reveals aggression.

Figure 43 U's: MEASUREMENT OF PRIMARY DEVIATION

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.

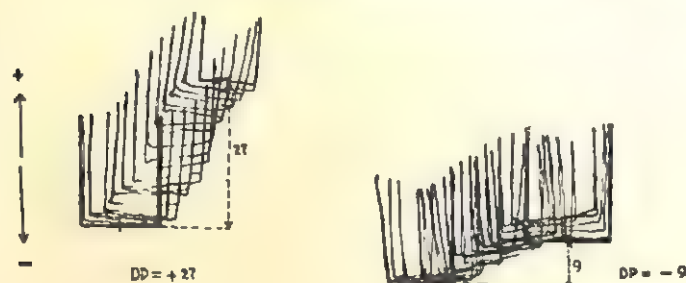
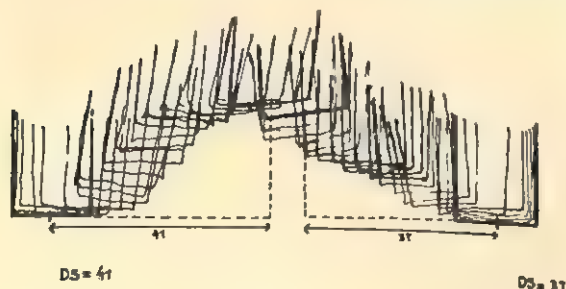


Figure 44 U's: MEASUREMENT OF SECONDARY DEVIATION

*Note:* The measurements, in millimeters, have been made upon the reduced figure, not the original drawing.



However, one must be wary of this interpretation because, at times, timid subjects, realizing they are at the end of the test, relax when they make the sagittal U's. This state of mind may encourage movements of extension and thus produce a false impression of aggression.

#### SECONDARY DEVIATION (S.D.)

*Measurement* (Figure 44): The S.D. is the horizontal distance that separates the center of the standard horizontal base or its projection and the center of the horizontal base of the last U drawn without visual control.

*Interpretation:* The secondary deviation here, as in other cases, expresses the subject's emotivity.

## *Four* : INTRA-PSYCHIC

### COHERENCE

Constancy between drawings of the left hand (which reflects constitutional, permanent, genotypic attitudes) and those of the right hand (reflecting attitudes of a reactional, temporary, phenotypic nature) is said to denote intra-psychic coherence.

Statistical studies of intra-psychic coherence were made at the Institute of Orientation and Professional Selection in Rio de Janeiro with adolescents and adults. Among a group of 177 normal adolescents, aged sixteen to twenty-one, differences between drawings of the two hands were particularly noticeable in primary deviations, and especially in vertical primary deviations. These differences were even more apparent among adults. Therefore it seems reasonable to calculate the degree of intra-psychic coherence on the basis of primary deviations of the various drawings.

Because the P.D. varies in significance for the three

planes in which the test is taken, partial intra-psyhic coherence may be determined, revealing constancy in a given psychological area. However, an average measure also may be obtained by taking the mean of these areas of partial coherence.

The following formula for the measurement of intra-psyhic coherence has been tentatively proposed by Professor Alfredo de Oliveira Pereira pending further investigation:

(1) The three coefficients of partial psyhic coherence (intra-extratension, auto-heteroaggressiveness, depression-  
elation) are obtained by using Spearman's ordinal formula.

(2) The mean of these three coefficients denotes the I.P.C. (intra-psyhic-coherence) coefficient.

The following calculations, based on the drawings of an adolescent, illustrate psyhic coherence in the sagittal plane (correspondence between potential and actual aggression):

TEST	PRIMARY DEVIATION		RANKS		ORDINAL DIFFERENCE	
	L.h.	R.h.	L.h.	R.h.	d	d <sup>2</sup>
n						
Lineograms	+12	+16	3	3	0	
Zig-zags	-7	-7	4.5	5	0.5	0.25
Chains	+14	+17	2	2	0	
Parallels	-7	-6	4.5	4	0.5	0.25
U's	+15	+19	1	1	0	
<hr/>						<hr/>
5						0.50

$$P = 1 - \frac{6\Sigma d^2}{n(n^2 - 1)} = 1 - \frac{3}{120} = +.975$$



## *Five* : **ASSESSING INTELLIGENCE**

The M.K.P. is fundamentally a personality study, but it also permits an estimate of the subject's intelligence based on accuracy of the sketches and of the reproduction of complex forms (zig-zags and stairs). These evaluations stem from the fact that intellectually underdeveloped individuals are correspondingly deficient in the kinetic representation of space.

### **INTELLIGENCE SIGNS**

Professor Maria Carbonnell Grompone, Director of the Psychopedagogic Institute of Montevideo has demonstrated the presence of seven signs in the drawings of dull subjects:

*Sign 1:* The zig-zags are homologous instead of symmetrical. The individual is not aware of any axis of

symmetry and makes the same movement with both hands (Figure 45).

*Sign 2:* The angles in the zig-zag are very irregular due to lack of control in extending their sides (Figure 46).

*Sign 3:* Changes are made in the direction of the zig-zag which takes on the form of a snake (Figure 47).

*Sign 4:* The stairs are altered as follows:

a) Loss of shape (Figure 48).

b) Substitution of acute angles for right angles (Figure 49).

c) Tendency to abolish angles in descending movements (Figure 50).

d) Irregularity (all kinds of angles) (Figure 51).

e) Right angles irregularly placed (Figure 52).

*Sign 5:* Stairs are asymmetrical (Figure 53).

*Sign 6:* There are deviations of direction in the stair drawings (Figure 54).

*Sign 7:* There is axial deviation in the sagittal U (Figure 55).

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*Figure 45* LOW INTELLIGENCE: SIGN 1

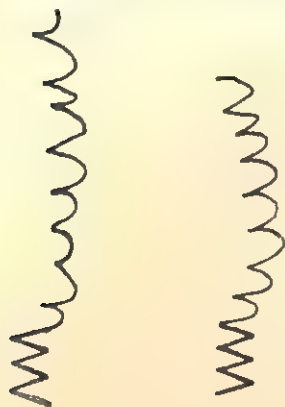


Figure 46 LOW INTELLIGENCE: SIGN 2

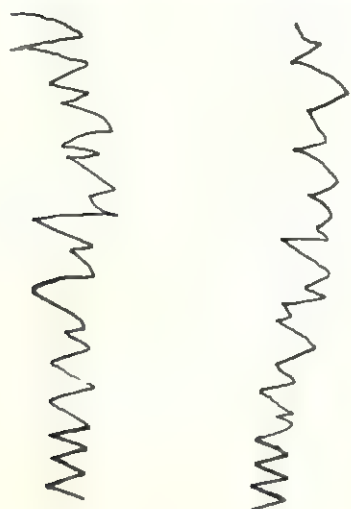


Figure 47 LOW INTELLIGENCE: SIGN 3

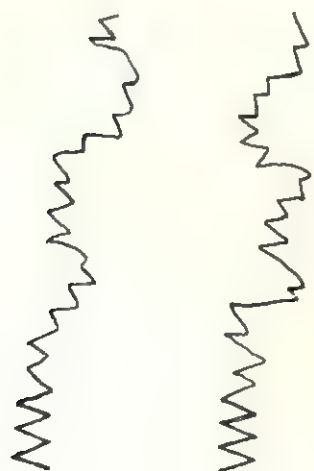


Figure 48 LOW INTELLIGENCE: SIGN 4a

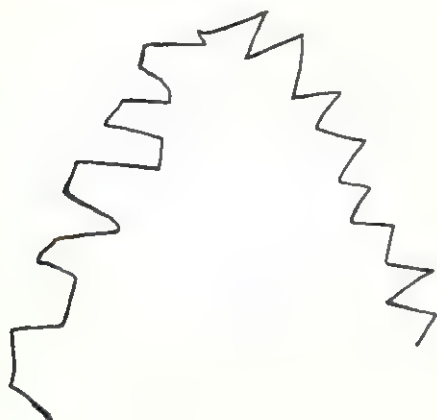
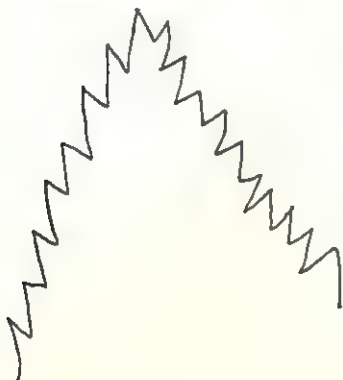


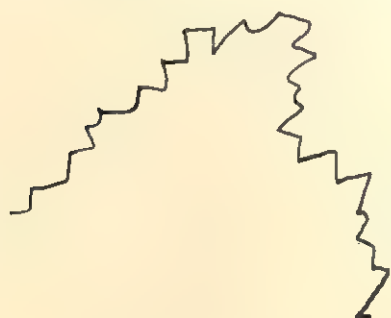
Figure 49 LOW INTELLIGENCE: SIGN 4b



*Figure 50* LOW INTELLIGENCE: SIGN 4c



*Figure 51* LOW INTELLIGENCE: SIGN 4d



*Figure 52* LOW INTELLIGENCE: SIGN 4e



*Figure 53* LOW INTELLIGENCE: SIGN 5



*Figure 54* LOW INTELLIGENCE: SIGN 6



*Figure 55* LOW INTELLIGENCE: SIGN 7



*Statistical data:* In a sample of 100 subjects where three or more signs of M.K.P. intellectual deficiency were present, correlation between these signs and batteries of intelligence tests<sup>1</sup> used by the Morey Otero Laboratory were:

Between M.K.P. signs of intelligence and spatial battery	0.64
Between M.K.P. signs of intelligence and abstract battery	0.55
Between M.K.P. signs of intelligence and verbal battery	0.42
Between M.K.P. signs of intelligence and average of results of spatial and abstract batteries	0.73

<sup>1</sup> *Editors' note.* Mira does not identify the intelligence tests used.



## **Six : NORMAL AND**

## **PATHOLOGICAL RESULTS**

This chapter reports upon the results obtained in a variety of studies of normal and pathological subjects using the M.K.P. method.

### **PERSONALITY CHARACTERISTICS OBSERVED WITH M.K.P.**

As the test and its scoring methods were described, a variety of personality characteristics observed in subjects were also described. These may be summarized as follows:

- (1) Permanent, constitutional, genotypic attitudes, expressed by drawings of the weaker hand (usually the left hand).

- (2) Transitory, phenotypic reactions, expressed by the dominant hand (usually the right).
- (3) The degree of intra-psychic coherence, indicated by similarity of deviations in drawings made by both hands.
- (4) The degree of aggressiveness, expressed by the average of the primary deviations in the sagittal plane.
- (5) The degree of depression or of euphoric excitation, indicated by the average of the primary deviations in the vertical plane.
- (6) Predominance of intratension or extratension, indicated by the primary deviation of lineograms in the horizontal plane and confirmed by the direction of axial deviations of the zig-zags, chains, and parallels.
- (7) The degree of constitutional emotivity, revealed by secondary deviations of the left hand, and emotional control, conveyed by secondary deviations of the right hand.
- (8) A tendency toward anxiety or apathy.<sup>1</sup>
- (9) The predominance of a tendency toward excitation or to inhibition.<sup>2</sup>
- (10) The degree of constancy of reactions is indicated by the primary deviations of each hand on tests in the same plane. Usually, the primary deviation of the non-dominant hand is greater.
- (11) Intelligence.
- (12) Indications of conflict situations or of bewilderment.
- (13) Indications of pathological data in personality make-up.

<sup>1</sup> & <sup>2</sup> *Editors' note:* Mira apparently presumes that anxiety and apathy are at opposite ends of a continuum, and makes the same presumption for excitation and inhibition. These presumptions are psychodynamically questionable.

## CHARACTERISTICS OF NORMAL GROUPS

In the following section, discussion centers around the characteristics of four normal groups:

- (1) Normal adults
- (2) Superior adults
- (3) Children
- (4) Adolescents

## NORMAL ADULTS

A group of 200 normal adults of both sexes were given the M.K.P. test at the Orientation and Professional Selection Institute of Rio de Janeiro. The characteristics of this group are summarized in Table 1.

*Length of Lines:* The sample reveals that linear length in left-hand drawings exceeds that of drawings done with the right hand for both sexes, and that this length is distinctly greater for both hands in female subjects. Drawings of male subjects for either hand fail to attain the length of the standard (40 mm.), while female drawings exceed 40 millimeters with the left hand and hover around 40 mm. with the right.

Maximal and minimal linear lengths of the zig-zags are practically equal in both sexes for both hands, although, here too, length of lines drawn by females tends to be greater, confirming previous data. This suggests a constitutional predisposition to excitation which is relatively greater among women than among men.

*Primary Deviation:* Aggression, as indicated by the

sagittal primary deviation, is positive in both sexes with higher mean scores for the right hand. Aggressiveness is revealed particularly in the U's, chains, and lineograms. The differences between the means of the U's of the two hands is significant at the 5 per cent level. The other measures fail to reach this level of significance but indicate a trend of higher positive P.D. among women than among men. The following are the average P.D.'s in the sagittal plane for a combination of U's, chains, and lineograms:

MEN		WOMEN	
Left Hand:	+5.4	Left hand:	+7.8
Right Hand:	+7.8	Right Hand:	+9.0

In the vertical plane, primary deviations are generally negative—which is psychologically characteristic of a depressed population. Data obtained from the sample reveal that this depression is greater among men and more marked for the left or genotypical hand. Average P.D.'s obtained for the lineograms, stairs, circles, chains, and U's are:

MEN		WOMEN	
Left Hand:	-14.8	Left Hand:	-18.8
Right Hand:	-20.2	Right Hand:	-19.8

Averages of primary deviations in the horizontal plane for lineograms and parallels show greater introversion among women than men:

MEN		WOMEN	
Left Hand:	-2.5	Left Hand:	-5.0
Right Hand:	-2.5	Right Hand:	-4.5

*Secondary Deviation:* Secondary deviations calculated from the lineograms, circles, vertical U, and sagittal U are generally higher among women, especially for the left

hand. The mean secondary deviation for women statistically supports the premise that their constitutional emotivity is stronger than in men, the difference being significant for the left-hand drawing of the sagittal U:

MEN		WOMEN	
Left Hand:	10.35	Left Hand:	17.25
Right Hand:	10.25	Right Hand:	12.00

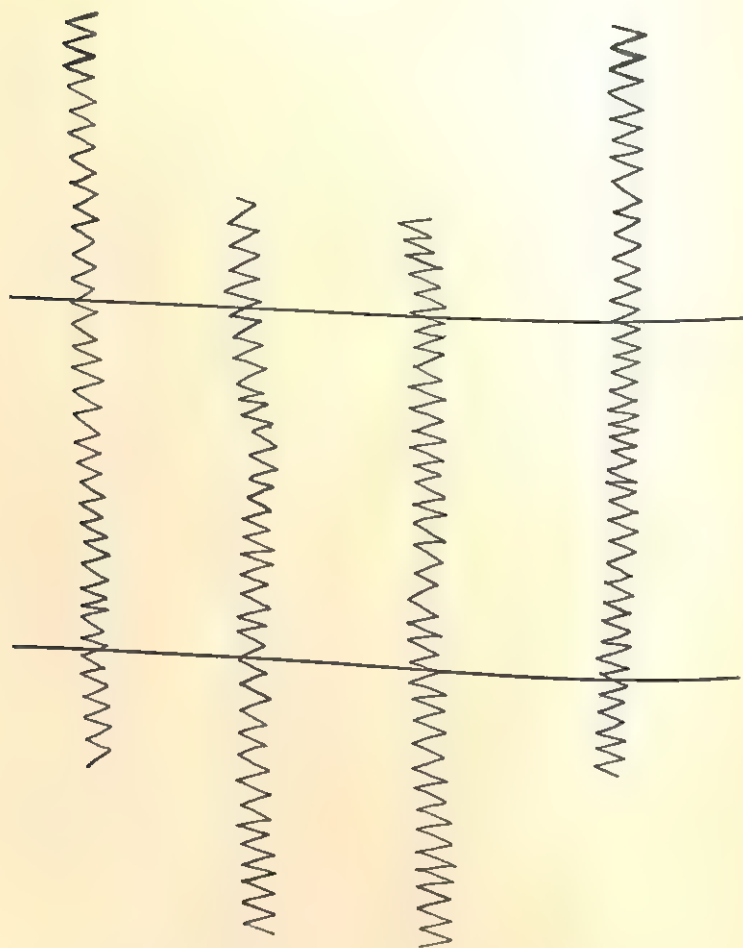
Tables 2 through 10 were obtained from a Brazilian sample by Professor Alfredo de Oliveira Pereira. They may be used as a quick guide for averages of the M.K.P., with the following qualifications:

- (1) Each group of subjects must have a scale of its own, and consequently these tables are valid only for normal Brazilian adults of both sexes.
- (2) Each tetron represents the upper limit of whole and fractional values greater than the values of the tetron immediately below it.
- (3) Degrees or scores should not be rounded out when converting to the tetron scale.
- (4) The tetron scale ranging from +4 to -4 may be used to classify normal individuals, and to suggest cases bordering on the abnormal zone—that is, those subjects with scores above or below the values of +4 or -4.

#### SUPERIOR ADULTS (FIGURE 56)

Due to the prevalence of “disturbed” personalities, it would be somewhat foolhardy to use “the man on the street” indiscriminately to obtain measures to serve as standards for the concept of psychic equilibrium. Therefore, when I started this study, Professor Aubrey Lewis

*Figure 56* ZIG-ZAGS OF AN ADULT OF  
SUPERIOR INTELLIGENCE



and I decided to form a small control group of persons whose past history and conduct evidenced a lack of characterological anomalies and pronounced genotypic de-

fects. The results obtained in London with this group convinced me of the value of the M.K.P. We obtained near-perfect drawings and a very low average for the deviations, confirming our hypothesis that undiagnosed neurosis or psychosis exists among the first group or "man on the street." By the same token, through the M.K.P. we found the means of differentiating between "normality" and mental disturbance. Later, I conducted another control study of the drawings of eighteen men and eleven women, considered "superior," not only by virtue of their intelligence but because of their serenity, wisdom, and harmony of conduct.

The principal differences that distinguish superior adults from the randomly selected groups are:

- (1) Less difference in linear dimensions between the standard and the drawings.
- (2) Smaller average of primary and secondary linear deviations.
- (3) Total absence of axial deviations.
- (4) Greater values for the coefficients of coherence and constancy.

## CHILDREN

Statistically valid results of the M.K.P. are not yet available for different levels of childhood maturity, except for those published in Montevideo concerning 100 ten-year olds, and shown in Table 11. However, personal experience with the test indicates the following:

- (1) Many of the characteristics encountered in drawings of pathological adults are to be found, and are even exaggerated in children's drawings. This supports



- the Jacksonian and Freudian viewpoints on regression of mental functions in psychosis.
- (2) Drawings of the two hands are very similar among children who have not yet learned to write. This homogeneity supports our view that functional dissociation between the two halves of the body is an evolutionary phenomenon, abetted by the pressure of cultural surroundings.
  - (3) Lack of integration in complex configurations and axial deviation in the sagittal plane are particularly characteristic of children's drawings. Axial deviation appears because of the following: When the subject is deprived of sight, he cannot compensate for his instinctive tendency to move his hand, pencil, and elbow in the oblique axis corresponding to the plane of semiflexion in which these segments are situated with regard to the arm. This also explains the child's tendency to turn his head when writing and, by analogy, to turn the paper until it is in a position perpendicular to the axis mentioned.
  - (4) The similarity between some children's drawings and those of pathological subjects is such that in the absence of other data, it may be difficult to differentiate between them. However, the former are generally characterized by lack of precision and disrhythmia of elementary movements, while in the latter, a difficulty in the coordination of the same movements is predominant. In other words, children tend to manifest alterations of intra-kinetic impetus which prevail over inter-kinetic anomalies.

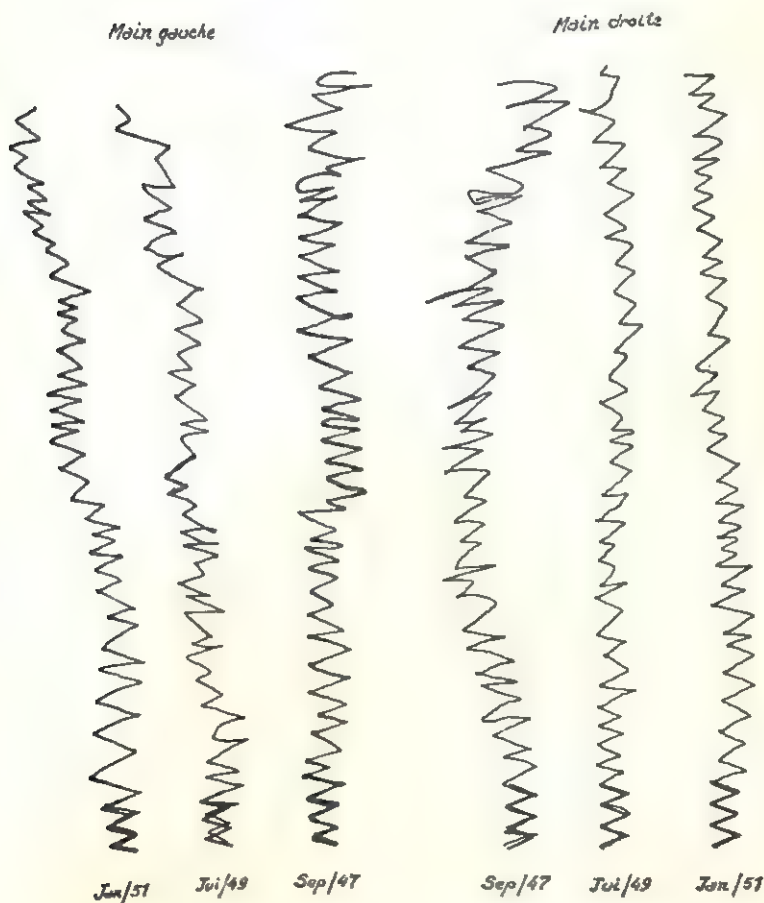
#### ADOLESCENTS

Among adolescents (Tables 12 and 13, Figure 57) one finds a mixture of childish characteristics (in regression)



Figure 57 EXAMPLES OF ZIG-ZAGS BY  
AN ADOLESCENT EXAMINED AT 16, 18 AND  
20 YEARS

The gradual disappearance of disrhythmic and *schizopraxique* traits can be seen, while at the same time the persistence of the basic configuration of his personality remains.



and adult characteristics (in formation). The drawings are unstable from the viewpoint of tonicity; frequent signs of intra-tension appear. Positive secondary or axial deviation in the parallels reveals the adolescent's impatience, need for affection and contact with the environment. Values for aggression are greater than those of adults. Signs of contra-pulsion also appear—that is, movements which are in opposition to the ones in process; this indicates a schizoid trend. In general, M.K.P. reveals a personality in crisis, as indeed it is during this time of life.

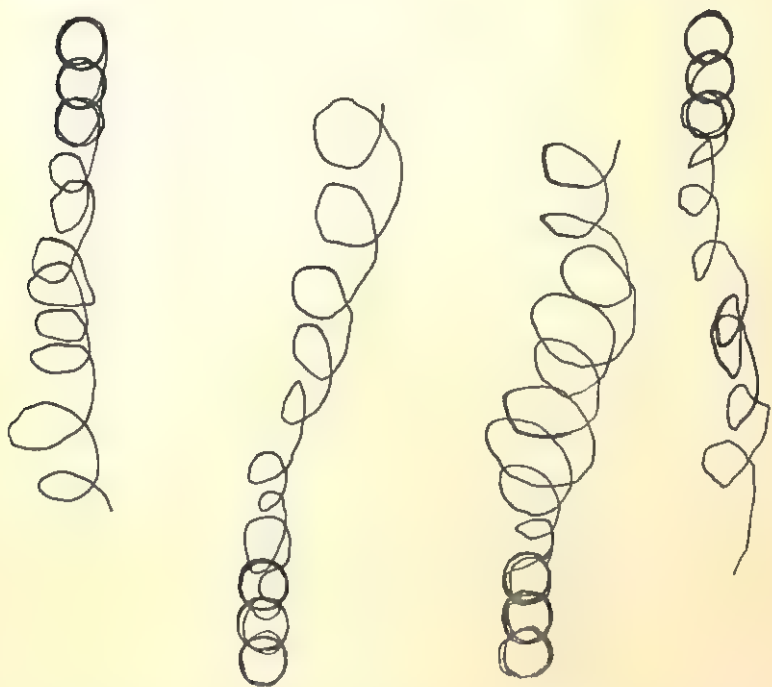
#### ABNORMAL CHARACTERISTICS

The clinical application of the M.K.P. is a wide and useful one. The value of the test in the area of differential diagnosis is illustrated by the following types of data:

- (1) Characteristics of primitive peoples
- (2) Characteristics of homicidal personalities
- (3) Characteristics of psychopathic personalities
- (4) Signs of schizophrenia
- (5) Signs of cyclophrenic cases
- (6) M.K.P. in epileptoid (disrhythmic) cases
- (7) Characteristics of congenital deficit (oligophrenia) or acquired deficit (dementia)
- (8) Organic psychoses
- (9) Neurological disorders

#### PRIMITIVE PEOPLES (TABLE 14, FIGURE 58, AND REFERENCES 39, 47, 75)

Drawings have been obtained from Bororos, Kaingang, and Carajas Indians of Central Brazil, and from Negroes

*Figure 58* CHAINS OF A PRIMITIVE PERSON

of various tribes in Septentrional Africa. The M.K.P. drawings of primitives show these characteristics:

- (1) Tendency toward syncretic movements, without any analysis of form, resulting in a predominance of curved drawings, especially in the zig-zags, stairs, and U's.
- (2) General deficit in making complex drawings (Figure 61).
- (3) Highly developed intra-psychic coherence revealed in symmetry of the stairs.
- (4) Higher vital tonicity.

- (5) Tendency toward inhibition, that is, fear (diminution of the drawings) when the individual faces a difficulty.
- (6) Great fluctuations in linear lengths.

HOMICIDAL PERSONALITIES (TABLE 15 .  
AND REFERENCES 5, 10, 18, 22, 36, 57,  
58, 62, 66, 74)

A study of murderers and habitual criminals was conducted in the prisons of Rio de Janeiro and Bahía. Characteristic traits of the group were:

- (1) Dominance of excitation over inhibition (expansion of linear lengths).
- (2) Good psychomotor tonicity.
- (3) Tendency toward extratension.
- (4) High degree of constitutional aggression, exaggerated by hostility at the time of the test. (Statistical analysis showed significant differences between the averages of sagittal primary deviations for the criminal group and a group of normal adults.) The following are the differences between the means in the two groups of twenty-eight normal adults and forty murderers:

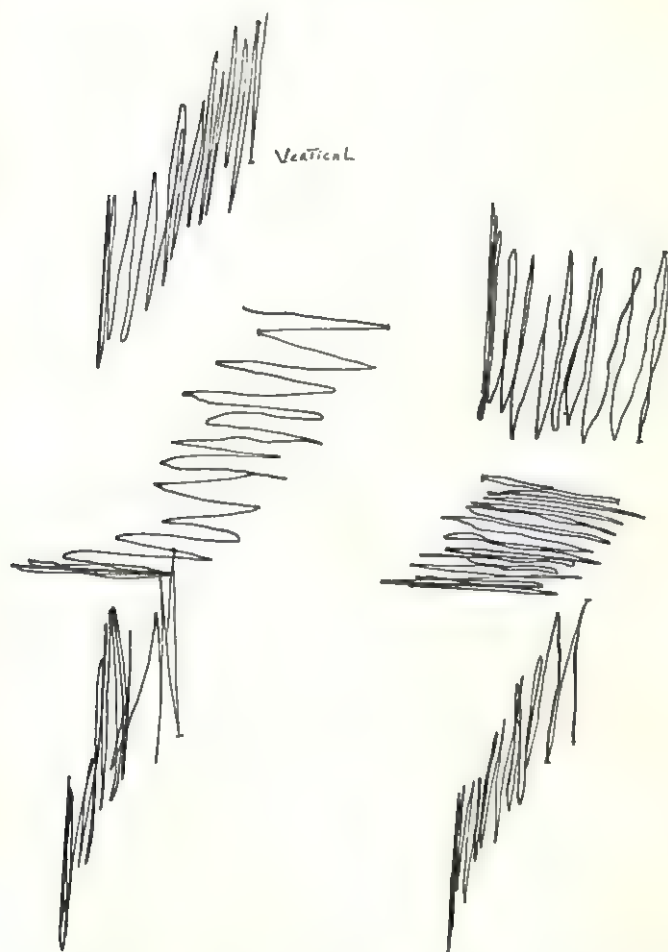
Normal, left hand ( + 13.45, - 5.96, + 4.95, - 15.36,  
+ 12.04 ) = + 1.82

Murderers, left hand ( + 17.83, - 0.67, + 24.46, + 11.00,  
+ 21.28 ) = + 14.77

Normal, right hand ( + 14.07, - 3.04, + 10.96, - 16.82,  
+ 5.00 ) = + 1.90

Murderers, right hand ( + 20.30, - 2.52, + 24.28, + 6.97,  
+ 21.13 ) = + 14.07

Figure 59 LINEOGRAMS OF AN HYSTERIC



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PSYCHOPATHIC PERSONALITIES  
(FIGURE 59)

The M.K.P. of neurotics is distinguished by the following:

- (1) Low value of the coefficient of coherence, and of the coefficient of constancy or reliability.
- (2) Increase in the mean of primary deviations in the linear kinetograms, which is always higher than 10 centimeters.
- (3) Irregularity, carelessness, and instability of movements of the left hand.
- (4) High secondary deviations.
- (5) Presence of signs corresponding to the cyclothymic or schizothymic constellation.
- (6) Initial tremors in the right lineograms.
- (7) Large mean variations between the linear dimension of the standard and that of the drawing, especially for the left hand.

#### SCHIZOPHRENIC STATES

Many authors have used the M.K.P. to study cases belonging to the schizophrenic constellation (references 21, 32, 43, 59, 83, 87; and Figures 60-64).

Among patients with schizophrenic syndromes, the following categories can be differentiated:

- (1) Reactive forms
- (2) Incipient schizophrenia
- (3) Processes temporarily inactive (by insulin treatment or spontaneous remission)
- (4) Terminal forms with disintegration and regression of the personality (schizophrenic dementia) or "terminal stupidity" (Kraepelin's "*Verblödung*")

In general, regardless of type, subjects who are unquestionably schizophrenic show the following abnormal characteristics in their M.K.P.:

- (1) Disorientation and axial torsion, especially in the sagittal lineograms.
- (2) A tendency to reversion of the current movement.
- (3) A tendency to disintegration of configurations.
- (4) Irregularity of movement manifested at times by exhaustion of impetus and at other times by sudden increase in swiftness, intensity, and extension.
- (5) Dissociation or lack of synchronism in combined and simultaneous movements of both hands in the zig-zag.

To these signs should be added a global, qualitative impression. The drawings have a "confused, sticky" quality and a lack of style corresponding to the lack of unity observed in the personal synthesis of such a subject.

Specific characteristics for the specific schizophrenic types mentioned above are described in the following sections.

*Reactive Forms:* This is a form of schizophrenia, however extravagant, in which the symptomatology is psychologically understood and which is conditioned by conflicts or psychological situations capable of altering the type of individual reaction without seriously compromising the fundamental structure of the personality, and where, therefore, complete recovery is possible. In these cases, the M.K.P. shows a predominance of changes in drawings of the controlled hand (right among the right-handed, left among the left-handed). Also, axial deviations are slight while scores indicating introversion and aggression are high. In the terminal phase we see numerous reversions of the zig-zags.

*Incipient Cases:* These cases are characterized by "paranoid focalization," that is, by the confluence of direct



deviations of right lineograms toward the center of the paper. Reversals, axial torsion in the zig-zags, crossing of parallels, and deviation of U's, especially in egocifugal drawings, are also present. However, complex configurations remain relatively intact; that is, neither the style nor the general architecture of the kinetic patterns are lost. As the disease progresses, and as disintegration of the deep strata of the personality takes place, that is, as the individual becomes more rigid and withdrawn, the drawings of both hands flatten out and the over-all patterns are changed. The chains are twisted, dislocated, and "sawed off"; the stairs begin to change into an incoherent assemblage of movements, and the zig-zag as such disappears, giving way to a fringe, thick in places and thin in others, but always enmeshed by the intersection of lines in different directions. When these changes occur in both hands, it is almost certain that the individual has suffered previous attacks or that the present illness is a form of "schizocaria" (the catastrophic schizophrenia of Mauz) in which the virulence of the process leads to rapid destruction of the personality. In the absence of genotypic antecedents, the presence of a complicating organic factor should be suspected (syphilis, toxemia, dysendocrinia, etc.).

*Temporarily Inactive Processes:* When, due to effective treatment or the event of spontaneous remission, the attack is overcome and the process remains inactive, these changes are evidenced in the M.K.P., which indicates at least partial restoration of the personality, with almost complete disappearance of alterations in drawings of the left hand. If the subject is left-handed, this sign has no diagnostic value and not enough documentation is avail-



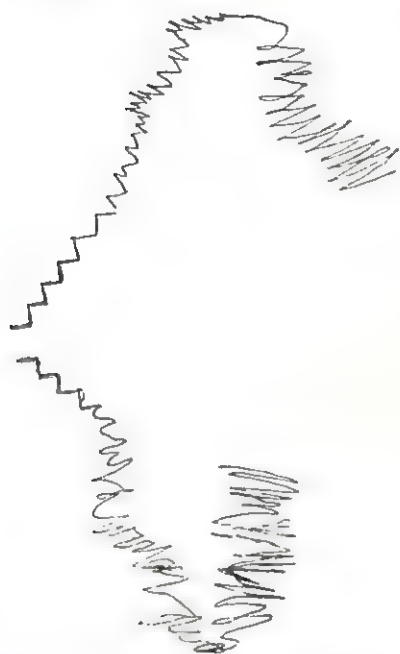
*Figure 60* LINEOGRAMS OF A SCHIZOPHRENIC

able to interpret the drawings in this case. The persistence of the schizophrenic process despite an apparent clinical remission is revealed by lack of precision and "confusion" in the left stairs, chain, and zig-zag, particularly, as well as by intersection of parallels on the same side.

Figure 61 ZIG-ZAGS OF A SCHIZOPHRENIC



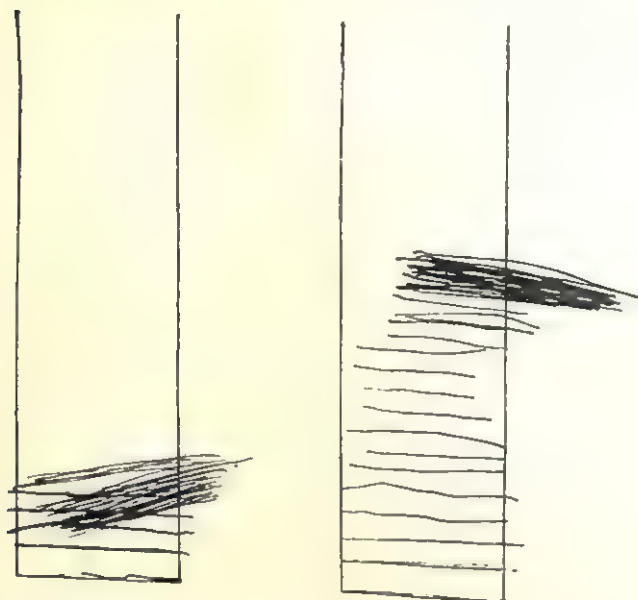
*Terminal Forms:* In the terminal stage the entire gamut of alterations occurs in both hands. Notably, the secondary deviation of horizontal lines is very great (lack of precision of the lineograms in the controllable direc-

*Figure 62* STAIRS OF A SCHIZOPHRENIC

tion), the configurations or kinetic patterns dissolve, and the lineograms are finally transformed into nothing more than pencil marks.

The application of modern somatic therapies to schizophrenia (insulin, metrazol, and electric shock therapy) have shortened the course of the illness and provide an excellent opportunity to observe the relationship between improvement and the return of normal drawings. The M.K.P. clearly indicates whether or not a relapse may be expected. In general, an improvement in the drawings of the dominant hand (that is, a disappearance of reversions in the sagittal drafts) may serve as a criterion for the interruption or continuance of treatment even when there has

Figure 63 PARALLELS OF A SCHIZOPHRENIC



already been an apparent remission. (See the works of Drs. Meljar and Coronel cited in the bibliography of this volume.)

#### CYCLOTHYMIC STATES (FIGURES 65-68)

While working in London at Maudsley Hospital with a small number of cases definitely diagnosed as manic or depressive states, and confirmed as such by their individual and genotypic antecedents, I had the opportunity to corroborate the important fact that, among these subjects, the most evident alterations of the drawings take place in the vertical plane. Moreover, the size of these alterations

*Figure 64* PARALLELS AND U's IN A  
SCHIZOPHRENIC PROCESS OF LONG  
STANDING

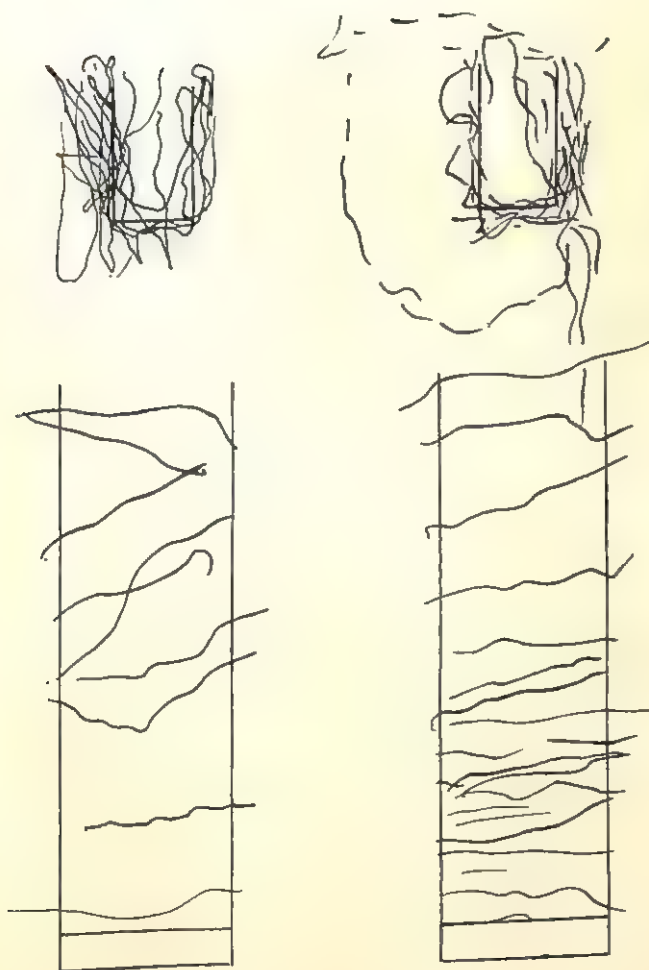
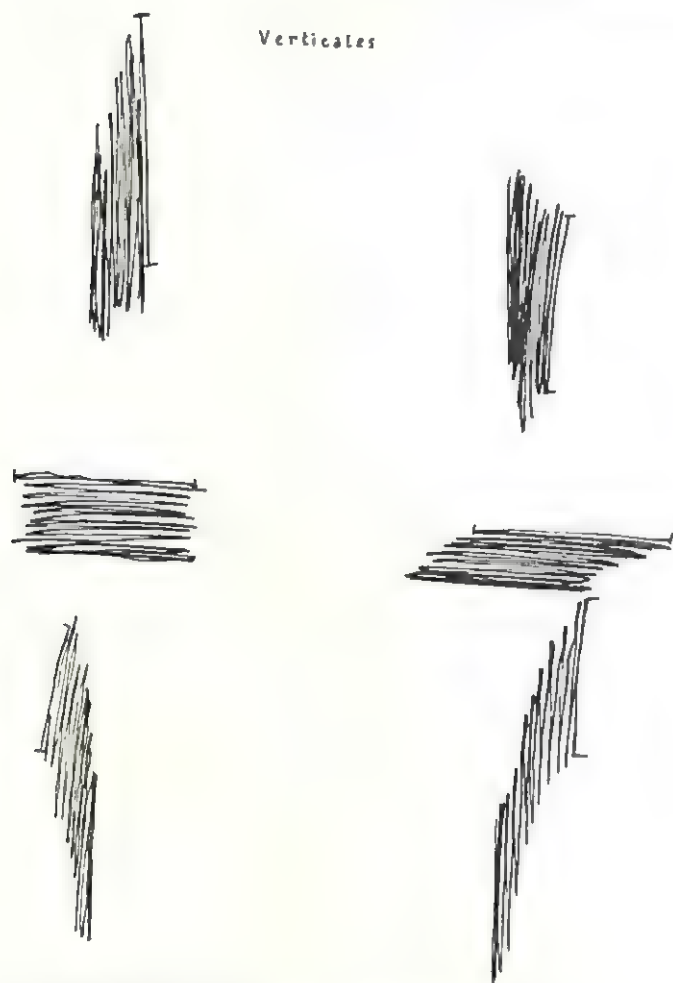


Figure 65 LINEOGRAMS OF AN HYPOMANIC



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varies with the intensity of symptoms fundamental to what Kretschmer calls the "diathetic scale," ranging from elation to depression, from joy to sadness, from feelings of omniscience to those of annihilation of the ego. Corresponding

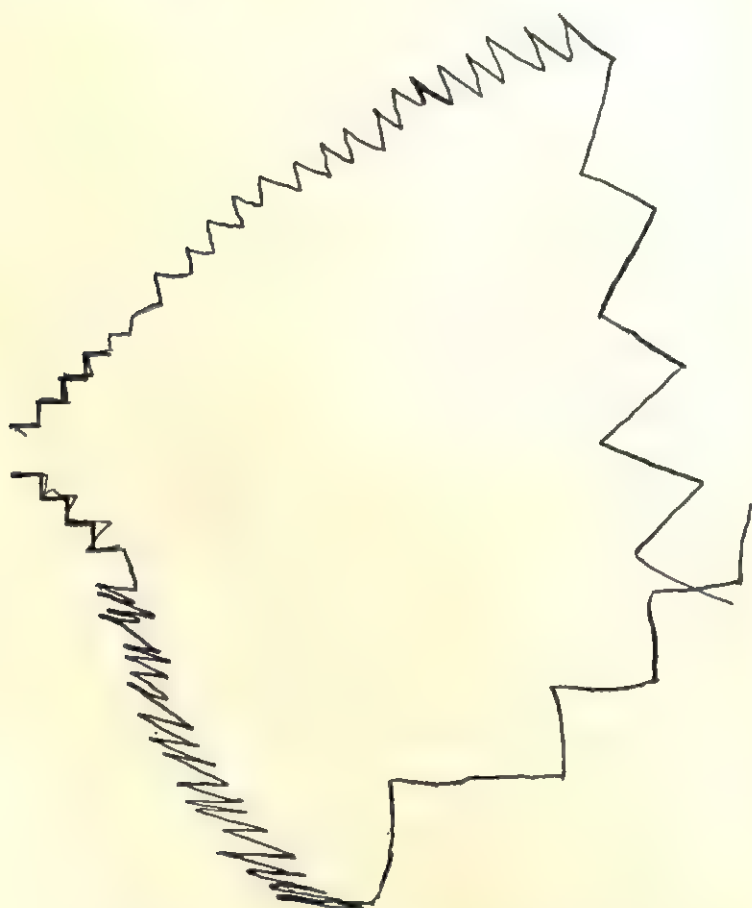
*Figure 66* LINEOGRAMS SHOWING  
PATHOLOGICAL AGGRESSION IN A  
CYCLOTHYMIC PERSONALITY



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to these changes in what Schneider calls "vital feelings," typical changes of ascent or descent occur in the vertical plane,

**Figure 67 STAIRS OF A CONSTITUTIONAL  
DEPRESSIVE**



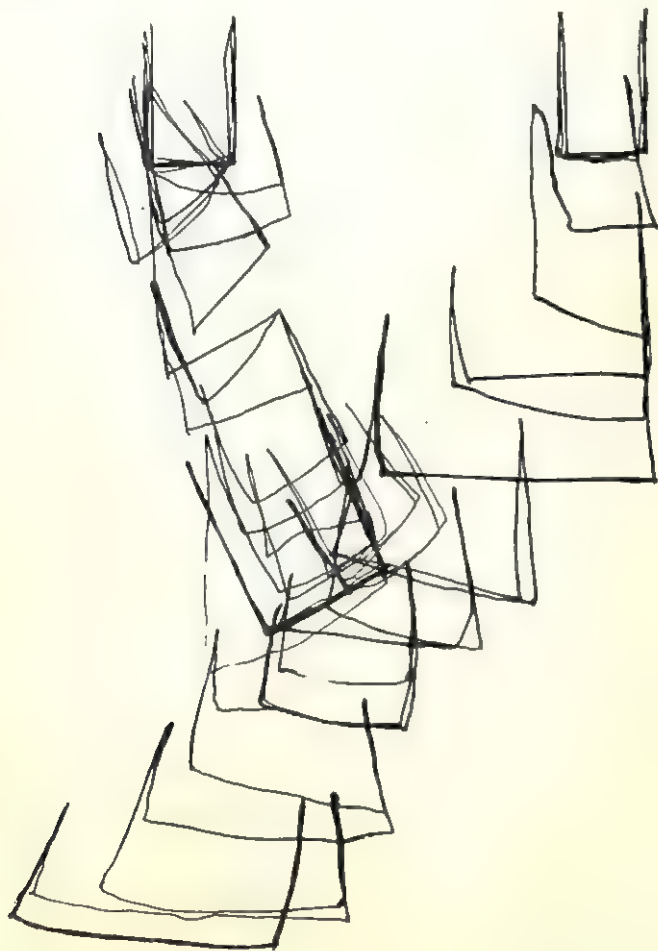
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As in schizophrenia, various cyclothymic reactions may be noted on the M.K.P. corresponding to the following clinical types:

- (1) Simple asthenic depressions



*Figure 68* VERTICAL U's OF A DEPRESSED ADOLESCENT



- 
- (2) Dysthymic depressions
  - (3) Pseudo-depressions of anxiety
  - (4) Psychogenic depressions (reactive or situational)

*Asthenic Depressions:* In these cases, there is a drop in the vertical lineograms, a sudden, sharp descent in the stairs, a bunching together of the ascending chains, with breaks in the descending chains, and a drop in the circle. However, there is neither an increase of aggressiveness (sagittal advance), nor an introversion of the horizontal lineograms, nor any perceptible alteration of linear dimensions.

*Dythymic Depressions:* Here, the indices of suffering are due more to "rage that the subject feels against himself" than to absence of strength or of energy to react. As a consequence, although the depressive signs already described may persist, they are accompanied by manifest introversion of the horizontal lineograms, increase and irregularity of linear dimensions, and ease of egocipetal movement in the zig-zag and in the parallels.

*Pseudo-Depressions of Anxiety:* These anxiety reactions correspond to those formerly called "agitated depressions," and are almost always of a toxic nature. Signs of incontinence and emotional ambivalence predominate, along with physical acceleration and an unrestrained need for movement. The subject oscillates between fear and despair without being really sad or depressed, but, rather, is subject to emotional flatness and bewilderment. His myokinetic behavior is characterized by acceleration of movements and gradual increase of linear dimensions during all the tests. Thus, the phenomenon of "heating" occurs which corresponds to processes of cerebral irradiation as opposed to processes of concentration. Surprisingly, in these cases the axial direction and complex myokinetic configurations remain intact, but the subject produces

enormous secondary deviations that give the designs a "turbulent" aspect similar to that observed in drawings by schizophrenic subjects (where, too, restraining action of the cerebral cortex is absent). But the two types can be differentiated not only by the greater fineness and precision of elementary drawings made by pseudo-depressives, but also by maintenance of the configurations in the pseudo-depressions, despite great haste in tracing the sketches. Moreover, in these psychoses, the basic character of the subject is revealed in the primary deviations of the lineograms.

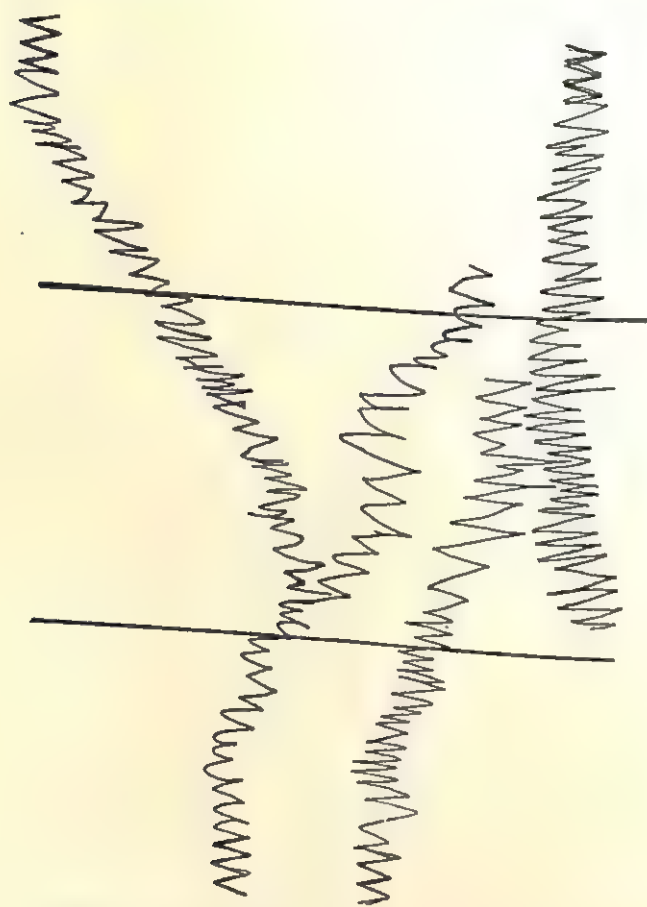
*Psychogenic or Reactive Depressions:* The characteristics of these depressions manifest themselves in psychomotor tensional deficit, principally in the dominant hand (right). The uneducated left hand presents changes only in the vertical plane. In this plane it is not uncommon to observe an inversion of deviations between the two hands, if the subject's character is hypomanic.

#### EPILEPSY (DISRHYTHMIA) (FIGURES 69-70)

In M.K.P. drawings one may find signs of epileptic disrhythmia due to paroxysmal disrhythmia in subjects who deny ever having had previous attacks.

Two parts of the test best reveal the existence of cortical disrhythmia: the zig-zags and the parallels. We have found almost complete agreement between M.K.P. and EEG data; in forty-six cases of cerebral disrhythmia indicated by our test, EEG confirmed its existence forty-two times.

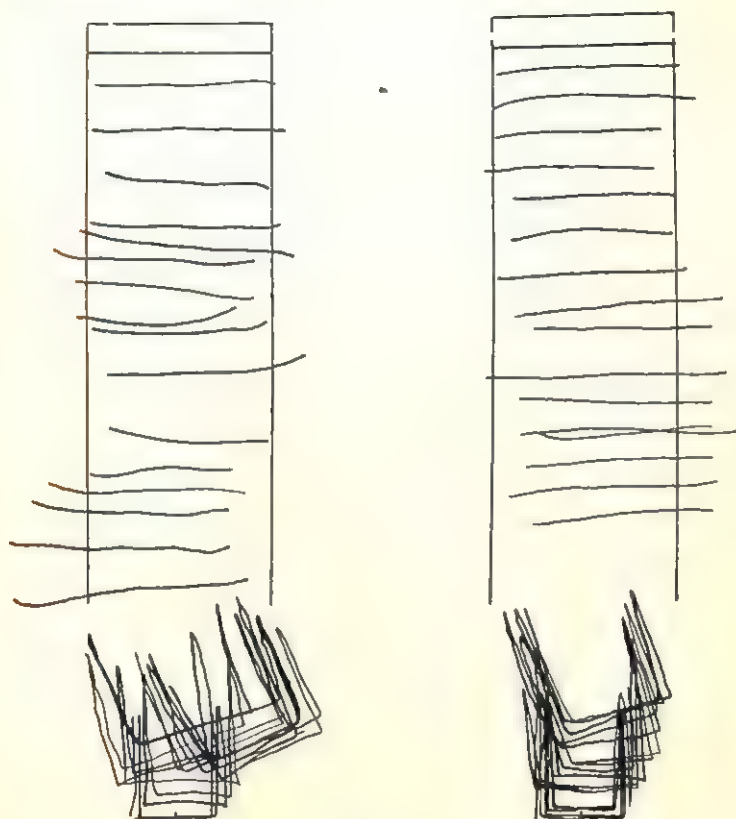
**Figure 69 ZIG-ZAGS OF AN EPILEPTIC PERSONALITY**



Eneketic disrhythmia is characterized in M.K.P. as follows:

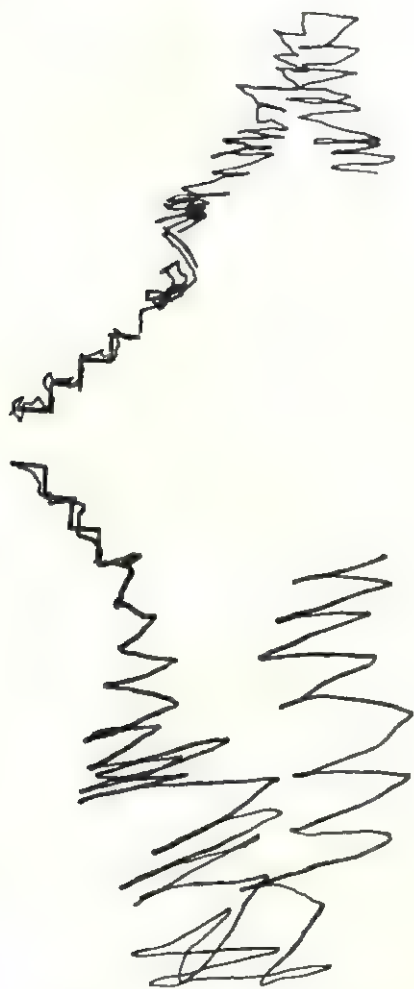
- (1) Lack of regularity in the zig-zags, caused by the sudden appearance of small clonic movements which produce spikes, along with an increase in the

*Figure 70* PARALLELS OF AN EPILEPTIC PERSONALITY



- 
- size and speed of movement.
- (2) Lack of regularity in the zig-zags due to a sudden slow-down of movement, accompanied by an inability to advance, or by a momentary loss of form that might last for a few seconds.
  - (3) Appearance of sudden and intense fluctuations in lengths of lines and spaces between lines in the parallels.

*Figure 71* STAIRS OF AN OLIGOPHRENIC  
(I.Q. 70, AGE 18)



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The combination of these three signs gives the impression of very sporadic drawings—that is, the designs are

*Figure 72* U's OF AN OLIGOPHRENIC

drawn by small explosive movements followed by hypokinesia or akinesia.

In Jacksonian epilepsy, the presence of reversals or counter-impulsions is exceptional. On the other hand, there is a frequent inability to maintain the shape of the steps in descent. This suggests that the subject cannot master the problem of changing direction; this is a planotopokinetic difficulty.

**SYNDROMES OF CONGENITAL  
(OLIGOPHRENIC) OR ACQUIRED  
DEFICIT (FIGURES 71-72)**

The essential characteristic in these cases is poor reproduction of complex forms. The subjects lack kinetic representation of space; thus, as soon as they lose visual control, their movements become disoriented and disorganized. This becomes more manifest where perfect execution requires better reflex integration than they possess. Consequently one observes coarseness and confusion in the zig-zag, loss of form in the stairs, disorientation of the parallels and the U's, and, above all, disorganization in the chains.



These are transformed into a hodge-podge of mixed forms and are so irregular as to resemble at times the drawings produced in organic syndromes—or hereditary degeneracy—of CNS disorders. However, among CNS subjects, severe difficulty in making basic elementary movements stamps their drawings with a typical, unmistakable quality.

#### ORGANIC PSYCHOSES (FIGURE 73)

In cases of organic psychoses, the subject's muscular difficulties stem both from organic deficit and from the psychosis. Diffuse and changing symptoms appear, marked by dislocation of the logical structure of thought, and the presence of new feelings, perceptions, and images. These are accompanied, in turn, by the disorganization of psychomotor activity and deep alterations of self and body images. As a consequence, in certain cases it is impossible to obtain the M.K.P. However, in many chronic organic states it is possible to elicit the drawings by taking advantage of an existing tendency to motor automatism ("echo-praxia"). The meagerness of our data in these cases permits only the statement that the M.K.P. reveals a mixture of schizophrenic signs, signs of anxiety, and phenomena of "decortication."

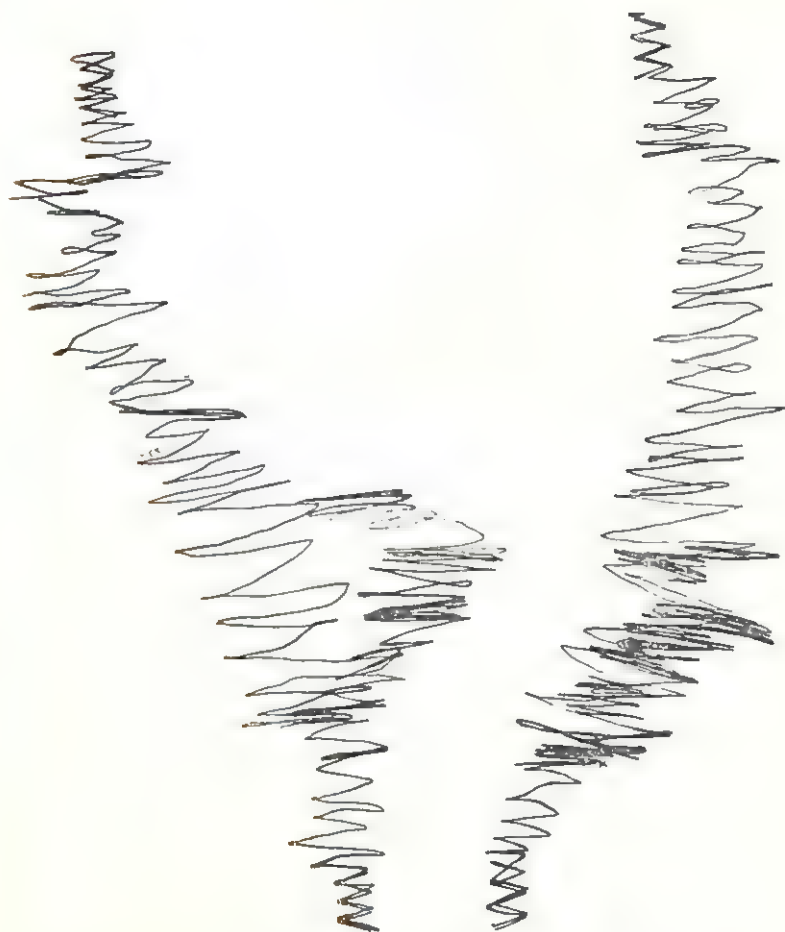
#### NEUROLOGICAL DISORDERS

It is regrettable that neurologists have not yet taken sufficient interest in the M.K.P., since it can disclose, often precociously, many organic nervous diseases even when clinical symptoms are not clearly manifested.

Thus the M.K.P. permits an early diagnosis of tabes-



*Figure 73* ZIG-ZAGS OF A PSYCHOTIC WITH ORGANIC DEMENTIA



dorsalis, Parkinson's disease, and of many focal cerebral lesions. (On this subject, the reader is referred to Mira-Galeono's work cited in the bibliography of this volume.)

Where the differential diagnosis is organicity versus

hysteria, the change in drawings under the influence of suggestion permits a rapid diagnosis in favor of hysteria.

## SOCIAL PSYCHOLOGY

In addition to its many other applications, the myokinetic test may be applied to the study of characteristics of social groups. Results of two studies are given below. The first study covered twenty families of Rio de Janeiro (Table 16). An analysis of variance of results obtained with the family group shows highly significant "F" values for intra- and intergroup measurements, as seen in the following table:

### MEASUREMENTS

	VALUE OF "F"	
	Very Significant Intragroup	Significant Intergroup
<i>Primary Deviation</i>		
a) Vertical	L.H.	L.H.
b) Sagittal		R.H.
<i>Sec. Dev.</i>	R.H.	L.H.—R.H.
<i>Axial Dev.</i>		R.H.
<i>Length of Lines</i>	L.H.	L.H.—R.H.
L.H.—Left Hand		L.H.—R.H.
R.H.—Right Hand		

In another study, the M.K.P. was applied in the selection of chauffeurs (see reference 92).

## APPENDIX A

### MEASUREMENTS OBTAINED BY THE MYOKINETIC PSYCHODIAGNOSIS

#### LINEOGRAMS

##### Left Hand

Primary Deviation—Horizontal

“ “ —Sagittal

“ “ —Vertical

Average Length of Lines

Average of Secondary Deviations

##### Right Hand

Primary Deviation—Horizontal

“ “ —Sagittal

“ “ —Vertical

Average Length of Lines

Average of Secondary Deviations

**ZIG-ZAGS**

**Left Hand**

**Egocifugal**

Maximum Length

Minimum Length

Linear Difference

Maximum Angle

Minimum Angle

Difference between Angles

Axial Deviation

Primary Deviation

**Egocipetal**

Maximum Length

Minimum Length

Linear Difference

Maximum Angle

Minimum Angle

Difference between Angles

Axial Deviation

**Right Hand**

**Egocifugal**

Maximum Length

Minimum Length

Linear Difference

Maximum Angle

Minimum Angle

Difference between Angles

Axial Deviation

Primary Deviation

**Egocipetal**

Maximum Length

Minimum Length

Linear Difference  
 Maximum Angle  
 Minimum Angle  
 Difference between Angles  
 Axial Deviation

## STAIRS AND CIRCLES

Left Hand  
     Stairs  
         Primary Deviation  
     Circles  
         Primary Deviation  
         Secondary Deviation  
 Right Hand  
     Stairs  
         Primary Deviation  
     Circles  
         Primary Deviation  
         Secondary Deviation

## CHAINS

Left Hand  
     Sagittal  
         Axial Deviation (Egocifugal)  
         Axial Deviation (Egocipetal)  
         Primary Deviation  
     Vertical  
         Axial Deviation (Ascending)  
         Axial Deviation (Descending)  
         Primary Deviation  
 Right Hand  
     Sagittal

Axial Deviation (Egocifugal)

Axial Deviation (Egocipetal)

Primary Deviation

Vertical

Axial Deviation (Ascending)

Axial Deviation (Descending)

Primary Deviation

## PARALLELS

Left Hand

Egocifugal

Maximum Length

Minimum Length

Primary Deviation (Linear Difference)

Average Axial Deviation

Egocipetal

Maximum Length

Minimum Length

Right Hand

Egocifugal

Maximum Length

Minimum Length

Primary Deviation (Linear Difference)

Average Axial Deviation

Egocipetal

Maximum Length

Minimum Length

U's

Left Hand

Vertical

Primary Deviation

Secondary Deviation

Sagittal  
    Primary Deviation  
    Secondary Deviation  
Right Hand  
    Vertical  
        Primary Deviation  
        Secondary Deviation  
Sagittal  
    Primary Deviation  
    Secondary Deviation

#### INTRA-PSYCHIC COHERENCE





## **A P P E N D I X   B**

**T A B L E S   O F   N O R M S ,   V A L I D I T Y   A N D  
R E L I A B I L I T Y   D A T A**

Table I : CHARACTERISTICS OF A GROUP OF NORMAL ADULTS\*

MEASURES	MALE			FEMALE		
	LEFT HAND		RIGHT HAND	LEFT HAND		RIGHT HAND
	Mean	$\sigma$	Mean	Mean	$\sigma$	Mean
<b>LINEOGRAMS</b>						
Length of Lines	39	8.5	38	42	6.7	40
{ Horizontals	+2	13.2	+1	-4	20.5	+2
{ D.P. Sagittals	+12	15.6	+16	+13	16.4	+19
{ Verticals	-6	15.8	-12	-3	10.6	-8
Secondary Deviation	10	4.8	10	11	6.0	10
						5.3
<b>ZIG-ZAG</b>						
<i>Egocifugal Movement</i>						
Maximum Length	17	4.1	17	19	5.7	19
Minimum Length	8	2.8	9	9	3.5	10
Maximum Angle	55	19.7	46	46	15.9	42
Minimum Angle	24	16.2	24	21	14.2	22
Axial Deviation	7	5.1	6	8	6.1	8
						6.5
<i>Egocpetal Movement</i>						
Maximum Length	17	4.1	17	19	5.1	19
Minimum Length	9	3.2	9	10	4.1	11
Maximum Angle	54	19.1	51	45	18.1	42
Minimum Angle	23	18.5	26	19	13.6	22
Axial Deviation	8	6.9	6	6	4.4	7
Primary Deviation	-7	22.6	-7	-3	31.2	-2
						30.8

\* The data presented in Tables 1-10 are derived from a group of 200 normal subjects tested at the Orientation and Professional Selection Institute of Rio de Janeiro.

**STAIRS***Primary Deviation*

-30	47.7	-32	46.7	-21	52.2	-25	51.0
-----	------	-----	------	-----	------	-----	------

**CIRCLES**

*Primary Deviation*  
*Secondary Deviation*

-33	44.2	-37	40.5	-35	41.9	-36	40.7
8	8.6	9	9.3	12	12.8	11	10.9

**CHAINS***Egocifugal Movement*

*Axial Dev. { Sagittal*  
*{ Vertical*

12	3.1	11	10.0	10	11.2	10	10.5
13	9.1	12	9.4	8	8.6	9	9.9

*Egocipetal Movement*

*Axial Dev. { Sagittal*  
*{ Vertical*

12	3.2	12	11.3	10	10.2	11	11.0
14	12.4	10	9.8	10	11.0	9	10.9
+14	23.7	+17	24.6	+11	59.4	+13	58.7
+2	24.1	-8	26.3	-29	49.2	-24	51.7

*Primary Dev. { Sagittal*  
*{ Vertical*

**PARALLELS***Egocifugal Movement*

*Maximum Length*  
*Minimum Length*

50	17.2	51	10.9	53	11.7	50	9.3
37	7.2	35	7.3	35	6.5	35	7.6

*Egocipetal Movement*

*Maximum Length*  
*Minimum Length*

52	9.9	50	10.5	53	10.2	49	8.3
37	7.5	36	7.3	37	7.5	36	7.2
-7	30.2	-6	33.4	-6	29.5	-11	29.1
14	9.2	15	10.9	12	8.2	16	10.5

*Primary Deviation*  
*Median Axial Deviation*

**U's**

*Primary Dev. { Sagittal*  
*{ Vertical*

+15	21.2	+19	18.2	+18	13.8	+26	13.4
-7	24.1	-12	19.6	-6	20.3	-6	17.5
17	12.7	15	13.6	23	17.0	14	12.4
16	12.4	16	14.5	23	15.2	13	6.8

*Secondary Dev. { Sagittal*  
*{ Vertical*

Table 2 : AGGRESSIVENESS IN NORMAL MALES

Primary Deviation in the Sagittal Plane of Lineograms, Zig-Zags, Chains, Parallels, and U's

LEFT HAND					RIGHT HAND					
Lineo-grams	Zig-Zags	Chains	Paral- lels	U's	Gauss Zones	Lineo-grams	Zig-Zags	Chains	Paral- lels	U's
+59	+61	+85	+84	+78	+12	+55	+65	+91	+94	+74
+55	+55	+79	+76	+73	+11	+52	+59	+85	+86	+69
+51	+50	+73	+69	+68	+10	+49	+53	+79	+78	+65
+47	+44	+67	+61	+62	+9	+45	+47	+72	+69	+60
+43	+38	+61	+53	+57	+8	+42	+42	+66	+61	+55
+39	+33	+56	+46	+52	+7	+39	+36	+60	+53	+51
+35	+27	+50	+38	+47	+6	+36	+30	+54	+44	+46
+32	+21	+44	+31	+41	+5	+32	+24	+48	+36	+42
+28	+16	+38	+23	+36	+4	+29	+19	+42	+27	+37
+24	+10	+32	+16	+31	+3	+26	+13	+35	+19	+33
+20	+4	+26	+8	+26	+2	+23	+7	+29	+11	+28
+16	-1	+20	+1	+20	+1	+19	+2	+23	+2	+24
+14	-4	+17	-3	+18	Mean Zone	+18	-4	+20	-2	+21
+12	-7	+14	-7	+15		+16	-7	+17	-6	+19
+10	-10	+11	-11	+12		+14	-10	+14	-10	+17
+8	-13	+8	-15	+10	-1	+13	-13	+11	-14	+14
+4	-18	+2	-22	+5	-2	+10	-18	+5	-23	+10
0	-24	-4	-30	-1	-3	+6	-24	-2	-31	+5
-4	-30	-10	-37	-6	-4	+3	-30	-8	-39	+1
-8	-35	-16	-45	-11	-5	0	-36	-14	-48	-4
-11	-41	-22	-52	-17	-6	-4	-41	-20	-56	-8
-15	-47	-28	-60	-22	-7	-7	-47	-26	-65	-13
-19	-52	-33	-67	-27	-8	-10	-53	-33	-73	-17
-23	-58	-39	-75	-32	-9	-13	-58	-39	-81	-22
-27	-64	-45	-83	-38	-10	-17	-64	-45	-90	-27
-31	-69	-51	-90	-43	-11	-20	-70	-51	-98	-31
-35	-75	-57	-98	-48	-12	-23	-76	-57	-106	-36

Table 3 : AGGRESSIVENESS IN NORMAL FEMALES

Primary Deviation in the Sagittal Plane of Lineograms, Zig-Zags, Chains, Parallels, and U's

LEFT HAND					RIGHT HAND					
Lineo-grams	Zig-Zags	Chains	Paral- lels	U's	Gauss Zones	Lineo-grams	Zig-Zags	Chains	Paral- lels	U's
+62	+91	+189	+83	+59	+12	+50	+90	+189	+76	+66
+58	+83	+174	+75	+55	+11	+47	+83	+174	+69	+63
+54	+75	+160	+68	+52	+10	+45	+75	+160	+62	+60
+50	+67	+145	+60	+49	+9	+42	+67	+145	+55	+56
+46	+59	+130	+53	+45	+8	+40	+60	+130	+47	+53
+42	+52	+115	+46	+42	+7	+37	+52	+116	+40	+49
+38	+44	+100	+38	+38	+6	+34	+44	+101	+33	+46
+34	+36	+85	+31	+35	+5	+32	+37	+86	+25	+43
+29	+28	+70	+24	+32	+4	+29	+29	+72	+18	+39
+25	+20	+56	+16	+28	+3	+27	+21	+57	+11	+36
+21	+13	+41	+9	+25	+2	+24	+13	+42	+4	+33
+17	+5	+26	+1	+21	+1	+22	+6	+28	-4	+29
+15	+1	+18	-2	+20	Mean Zone	+20	+2	+20	-7	+28
+13	-3	+11	-6	+18		+19	-2	+13	-11	+26
+11	-7	+4	-10	+16		+18	-6	+6	-15	+24
+9	-11	-4	-13	+15	-1	+16	-10	-2	-18	+23
+5	-19	-19	-21	+11	-2	+14	-17	-17	-26	+19
+1	-26	-34	-28	+8	-3	+11	-25	-31	-33	+16
-3	-34	-48	-36	+4	-4	+9	-33	-46	-40	+13
-8	-42	-63	-43	+1	-5	+6	-41	-60	-47	+9
-12	-50	-78	-50	-2	-6	+4	-48	-75	-55	+6
-16	-58	-93	-58	-6	-7	+1	-56	-90	-62	+3
-20	-65	-108	-65	-9	-8	-2	-64	-104	-69	-1
-24	-73	-123	-72	-13	-9	-4	-71	-119	-77	-4
-28	-81	-138	-80	-16	-10	-7	-79	-134	-84	-8
-32	-89	-152	-87	-19	-11	-9	-87	-148	-91	-11
-36	-97	-167	-95	-23	-12	-12	-94	-163	-98	-14

Table 4 : ENERGY AND VITAL TONE IN NORMAL MALES

Primary Deviation in the Vertical Plane of Lineograms, Stairs, Circles, Chains, and U's

Lineo-grams	LEFT HAND					RIGHT HAND				
	Stairs	Circles	Chains	U's	Gauss Zones	Lineo-grams	Stairs	Circles	Chains	U's
+41	+113	+100	+74	+65	+12	+33	+108	+85	+71	+47
+37	+101	+89	+68	+59	+11	+29	+96	+74	+64	+42
+34	+89	+78	+62	+53	+10	+25	+85	+64	+58	+37
+30	+77	+66	+56	+47	+9	+22	+73	+54	+51	+32
+26	+65	+55	+50	+41	+8	+18	+61	+44	+45	+27
+22	+54	+44	+44	+35	+7	+14	+50	+34	+38	+22
+18	+42	+33	+38	+29	+6	+10	+38	+24	+31	+17
+14	+30	+22	+32	+23	+5	+7	+26	+14	+25	+13
+10	+18	+11	+26	+17	+4	+3	+15	+4	+18	+8
+6	+6	0	+20	+11	+3	-1	+3	-7	+12	+3
+2	-6	-11	+14	+5	+2	-5	-9	-17	+5	-2
-2	-18	-22	+8	-1	+1	-8	-20	-27	-1	-7
-4	-24	-27	+5	-4	Mean	-10	-26	-32	-5	-10
-6	-30	-33	+2	-7	Zone	-12	-32	-37	-8	-12
-8	-36	-39	-1	-10		-14	-38	-42	-11	-14
-10	-42	-44	-4	-13	-1	-16	-44	-47	-15	-17
-14	-54	-55	-10	-19	-2	-19	-55	-57	-21	-22
-18	-66	-66	-16	-25	-3	-23	-67	-67	-28	-27
-22	-78	-77	-22	-31	-4	-27	-79	-78	-34	-32
-26	-90	-88	-28	-37	-5	-31	-90	-88	-41	-37
-30	-102	-99	-34	-43	-6	-19	-55	-57	-47	-41
-34	-114	-110	-40	-49	-7	-38	-114	-108	-54	-46
-38	-125	-121	-46	-55	-8	-42	-125	-118	-61	-51
-42	-137	-132	-52	-61	-9	-46	-137	-128	-67	-56
-46	-149	-144	-58	-67	-10	-49	-149	-138	-74	-61
-49	-161	-155	-64	-73	-11	-53	-160	-148	-80	-66
-53	-173	-166	-70	-79	-12	-57	-172	-159	-87	-71

Table 5 : ENERGY AND VITAL TONE IN NORMAL FEMALES  
 Primary Deviation in the Vertical Plane of Lineograms, Stairs, Circles, Chains, and U's

Lineo-grams	LEFT HAND					RIGHT HAND				
	Stairs	Circles	Chains	U's	Gauss Zones	Lineo-grams	Stairs	Circles	Chains	U's
+29	+138	+91	+19	+55	+12	+29	+28	+86	+131	+47
+26	+123	+80	+106	+50	+11	+26	+115	+76	+118	+42
+24	+110	+70	+94	+45	+10	+23	+103	+66	+105	+38
+21	+96	+59	+82	+40	+9	+20	+90	+56	+92	+33
+18	+83	+49	+69	+35	+8	+17	+77	+45	+79	+29
+16	+70	+38	+57	+30	+7	+14	+64	+35	+67	+25
+13	+57	+28	+45	+24	+6	+11	+52	+25	+54	+20
+10	+44	+17	+33	+19	+5	+8	+39	+15	+41	+16
+8	+31	+7	+20	+14	+4	+4	+26	+5	+28	+12
+5	+18	-4	+8	+9	+3	+1	+13	-5	+15	+7
+2	+5	-14	-4	+4	+2	-2	+1	-16	+2	+3
0	-8	-25	-17	-1	+1	-5	-12	-26	-11	-2
-2	-14	-30	-23	-3	Mean	-6	-19	-31	-18	-4
-3	-21	-35	-29	-6	Zone	-8	-25	-36	-24	-6
-4	-28	-40	-35	-9		-10	-31	-41	-30	-8
-6	-34	-45	-41	-11		-11	-38	-46	-37	-10
-8	-47	-56	-54	-16		-14	-51	-56	-50	-15
-11	-60	-66	-66	-21		-17	-63	-67	-63	-19
-14	-73	-77	-78	-26		-20	-76	-77	-76	-24
-16	-86	-87	-91	-31		-24	-89	-87	-89	-28
-19	-99	-98	-103	-36		-27	-102	-97	-102	-32
-22	-112	-108	-115	-42		-30	-114	-107	-115	-37
-24	-125	-119	-127	-47		-33	-127	-117	-127	-41
-27	-138	-129	-140	-52		-36	-140	-128	-140	-45
-30	-152	-140	-152	-57		-39	-153	-138	-153	-50
-32	-165	-150	-164	-62		-42	-165	-148	-166	-54
-35	-178	-161	-177	-67		-45	-178	-158	-179	-59

Table 6 : INTRA- AND EXTRATENSION IN NORMAL MALES AND FEMALES

Primary Deviation in the Horizontal Plane of Lineograms and Parallels

M A L E				F E M A L E			
LEFT HAND		RIGHT HAND		LEFT HAND		RIGHT HAND	
Lineo-grams	Parallels	Lineo-grams	Parallels	Lineo-grams	Parallels	Lineo-grams	Parallels
+42	+84	+39	+94	+58	+83	+55	+76
+38	+76	+36	+86	+52	+75	+50	+69
+35	+69	+33	+78	+47	+68	+46	+62
+32	+61	+30	+69	+42	+60	+41	+55
+28	+53	+26	+61	+37	+53	+37	+47
+25	+46	+23	+52	+32	+46	+33	+40
+22	+38	+20	+44	+27	+38	+28	+33
+19	+31	+17	+36	+22	+31	+24	+25
+15	+23	+14	+27	+17	+24	+20	+18
+12	+16	+11	+19	+11	+16	+15	+11
+9	+8	+7	+11	+6	+9	+11	+4
+5	+1	+4	+2	+1	+1	+6	-4
+4	-3	+3	-2	-1	-2	+4	-7
+2	-7	+1	-6	-4	-6	+2	-11
0	-11	-1	-10	-7	-10	0	-15
-1	-15	-2	-14	-9	-13	-2	-18
-5	-22	-5	-23	-14	-21	-7	-26
-8	-30	-9	-31	-19	-28	-11	-33
-11	-37	-12	-39	-25	-36	-16	-40
-15	-45	-15	-48	-30	-43	-20	-47
-18	-52	-18	-56	-35	-50	-24	-55
-21	-60	-21	-64	-40	-58	-29	-62
-24	-67	-24	-73	-45	-65	-33	-69
-28	-75	-28	-81	-50	-72	-37	-77
-31	-83	-31	-90	-55	-80	-42	-84
-34	-90	-34	-98	-60	-87	-46	-91
-38	-98	-37	-106	-68	-95	-51	-98
		Mean Zone				Mean Zone	



Table 7 : EMOTIVITY IN NORMAL MALES  
 Secondary Deviation of Lineograms, Circles, Vertical U's, and Sagittal U's

LEFT HAND				RIGHT HAND				
Lineograms	Circles	U Vertical	U Sagittal	Gauss Zones	Lineograms	Circles	U Vertical	U Sagittal
24	34	53	55	12	26	37	60	56
23	32	50	52	11	24	35	56	52
22	30	47	49	10	23	32	52	49
21	27	44	46	9	22	30	49	46
20	25	41	42	8	20	28	45	42
18	23	38	39	7	19	25	41	39
17	21	35	36	6	18	23	38	35
16	19	32	33	5	17	21	34	32
15	17	28	30	4	15	18	31	29
14	14	25	27	3	14	16	27	25
12	12	22	23	2	13	14	23	22
11	10	19	20	1	11	11	20	18
10.6	9	18	19	Mean Zone	10.7	10	18	17
10	8	16	17		10	9	16	15
9.4	7	14	15		9.4	8	14	13
9	6	13	14	-1	9	7	12	12
8	4	10	11	-2	7	4	9	8
6	2	7	7	-3	6	2	5	5
5	0	4	4	-4	5	0	2	1
4	-	1	1	-5	4	-	0	0
3	-	0	0	-6	2	-	-	-
2	-	-	-	-7	1	-	-	-
0	-	-	-	-8	0	-	-	-
-	-	-	-	-9	-	-	-	-
-	-	-	-	-10	-	-	-	-
-	-	-	-	-11	-	-	-	-
-	-	-	-	-12	-	-	-	-

Table 8 : EMOTIVITY IN NORMAL FEMALES

Secondary Deviation of Lineograms, Circles, Vertical U's, and Sagittal U's

	LEFT HAND				Gauss Zones	RIGHT HAND			
	Lineograms	Circles	U Vertical	U Sagittal		Lineograms	Circles	U Vertical	U Sagittal
29		50	69	74	12	26	44	33	51
28		47	65	70	11	25	41	32	48
26		44	61	66	10	23	38	30	45
25		41	57	61	9	22	36	28	42
23		38	53	57	8	21	33	27	39
22		34	50	53	7	19	30	25	36
20		31	46	49	6	18	27	23	33
19		28	42	44	5	17	25	22	30
17		25	38	40	4	15	22	20	26
16		22	34	36	3	14	19	18	23
14		18	31	32	2	13	16	16	20
13		15	27	27	1	11	14	15	17
11.8		14	25	25	Mean Zone	10.7	12	14	16
11		12	23	23		10	11	13	14
10.3		10	21	21		9.3	10	12	12
10		9	19	19	-1	9	8	11	11
8		6	15	15	-2	7	6	10	8
7		2	12	10	-3	6	3	8	5
5		0	8	6	-4	5	0	6	2
4		-	4	2	-5	3	-	5	0
2		-	0	0	-6	2	-	3	-
1		-	-	-	-7	1	-	1	-
0		-	-	-	-8	0	-	0	-
-		-	-	-	-9	-	-	-	-
-		-	-	-	-10	-	-	-	-
-		-	-	-	-11	-	-	-	-
-		-	-	-	-12	-	-	-	-

**Table 9 : ANXIETY AND INHIBITION IN  
NORMAL MALES**

*Linear Length of Lineograms and Zig-Zags*

LEFT HAND				RIGHT HAND		
Lineo-grams	Zig-Zag Maximum	Zig-Zag Minimum	Gauss Zones	Lineo-grams	Zig-Zag Maximum	Zig-Zag Minimum
65	29	18.6	12	57	30	17.8
62	28	17.8	11	55	29	17.0
60	27	17.0	10	54	28	16.3
58	26	16.2	9	52	27	15.6
56	25	15.4	8	51	26	14.8
54	24	14.6	7	49	25	14.1
52	23	13.8	6	47	23	13.4
50	22	13.0	5	46	22	12.7
48	21	12.2	4	44	21	11.9
45	20	11.4	3	43	20	11.2
43	19	10.6	2	41	19	10.5
41	18	9.8	1	40	18	9.7
40	17.5	9.4	Mean Zone	39	17.5	9.4
39	17	9		38	17	9
38	16.5	8.6		37	16.5	8.6
37	16	8.2	-1	36	16	8.3
35	15	7.4	-2	35	15	7.5
33	14	6.6	-3	33	14	6.8
30	13	5.8	-4	32	13	6.1
28	12	5.0	-5	30	12	5.4
26	11	4.2	-6	29	11	4.6
24	10	3.4	-7	27	9	3.9
22	9	2.6	-8	25	8	3.2
20	8	1.8	-9	24	7	2.4
18	7	1.0	-10	22	6	1.7
16	6	0.2	-11	21	5	1.0
13	5	0.0	-12	19	4	0.2

Table 10 : ANXIETY AND INHIBITION IN  
NORMAL FEMALES

Linear Length of Lineograms and Zig-Zags

LEFT HAND				RIGHT HAND		
Lineo-grams	Zig-Zag Maximum	Zig-Zag Minimum	Gauss Zones	Lineo-grams	Zig-Zag Maximum	Zig-Zag Minimum
62	37	22	12	51	40	25
60	35	21	11	50	38	24
59	34	20	10	49	36	23
57	32	19	9	48	35	22
55	31	18	8	47	33	21
54	29	17	7	46.5	31	19
52	28	16	6	46	29	18
50	26	15	5	45	28	17
49	25	14	4	44	26	16
47	23	13	3	43	24	15
45	22	12	2	42	22	13
44	20	11	1	41	21	12
43	19.7	10.5	Mean Zone	40.5	20	11.6
42	19	10		40	19	11
41	18.3	9.5		39.5	18	10.4
40	18	9				
39	16	8	-1	39	17	10
37	15	7	-2	38	16	9
35	13	6	-3	37	14	7
			-4	36	12	6
34	12	5	-5			
32	10	4	-6	35	10	5
30	9	3	-7	34	9	4
29	7	2	-8	33	7	3
			-9	32.5	5	1
27	6	1	-10	32	3	0
25	4	0	-11	31	2	-
24	3	-	-12	31	0	-
22	1	-		29	-	-

Table 11: TEN-YEAR-OLD MALE AND FEMALE URUGUAYAN CHILDREN \*

MEASURES	MALE			FEMALE			
	LEFT HAND		RIGHT HAND	LEFT HAND		RIGHT HAND	
	Mean	$\sigma$	Mean $\sigma$	Mean	$\sigma$	Mean $\sigma$	
LINEOGRAMS							
Length of lines { Horizontal	28.40	7.85	28.95	31.65	8.30	27.60	8.35
{ Sagittal	31.65	10.45	30.90	30.20	10.00	33.30	8.95
{ Vertical	33.65	10.60	31.30	32.05	12.10	32.05	10.00
P.D. { Horizontal	14.44	10.30	14.76	13.96	2.20	13.82	8.86
(posi- { Sagittal	19.99	10.63	24.61	21.15	10.47	22.00	11.00
tive) { Vertical	14.71	12.01	9.36	15.46	10.47	11.29	7.62
P.D. { Horizontal	10.75	9.77	11.00	13.80	6.10	11.24	7.96
(nega- { Sagittal	6.12	5.59	6.75	9.50	3.85	8.00	6.00
tive) { Vertical	14.54	11.20	13.65	11.04	8.67	13.59	8.34
P.D. { Horizontal	+1.02	15.76	+5.02	+3.26	17.36	+3.58	15.84
(Mean) { Vertical	-0.58	19.12	-3.38	-0.18	15.68	-2.34	15.84
S.D. { Horizontal	9.31	6.27	8.75	9.34	7.14	9.55	5.94
	12.65	10.65	10.75	10.42	8.40	9.91	7.50
	12.70	11.15	9.05	12.88	9.81	12.52	10.08

\* These data were obtained by C. Grompone and his collaborators at the Laboratoire de Psychopédagogie Morey Otero de Montevideo.

Table II (cont.)

MEASURES	MALE		FEMALE	
	LEFT HAND Mean $\sigma$	RIGHT HAND Mean $\sigma$	LEFT HAND Mean $\sigma$	RIGHT HAND Mean $\sigma$
<b>STAIRS (both sexes)</b>				
Primary Deviation	+1.10	15.60	-0.49	16.68
<b>CIRCLES</b>				
P.D. { Positive	10.91	6.81	9.63	7.64
{ Negative	16.10	11.85	14.78	11.79
{ Mean	-7.65	15.80	-5.45	14.50
Secondary Deviation	16.95	10.75	14.35	9.50
<b>U's</b>				
Sagittal { Positive	24.05	17.55	30.70	19.20
{ Negative	15.35	10.50	12.20	9.75
{ Mean	+26.40	24.60	+8.80	24.00
Vertical { Positive	18.25	9.70	17.10	11.85
{ Negative	29.23	21.35	23.30	23.90
{ Mean	-15.10	33.90	-7.33	64.20
S.D. { Sagittal	20.60	17.75	21.65	15.05
{ Vertical	24.45	18.50	22.75	17.15
			17.20	13.65
			15.10	11.30
			+0.40	19.70
			17.85	10.95
			25.15	19.25
			-11.60	26.80
			23.90	16.40
			23.95	19.45
			20.40	15.00
			14.00	11.40
			+12.90	20.00
			19.70	13.70
			29.10	23.35
			-12.90	34.10
			20.40	16.30
			22.40	16.70

**Table 12 : BRAZILIAN MALE ADOLESCENTS,  
AGED 16 TO 20\***

MEASURES	MEAN		STANDARD DEVIATION		
	Left Hand	Right Hand	Left Hand	Right Hand	
<b>LINEOGRAMS</b>					
<i>Length of lines</i>	32.5	31.0	6.4	5.6	
P.D. {	Horizontal	-5	-3	16.0	13.3
	Sagittal	+19	+18	12.8	13.1
	Vertical	-16	-9	11.4	15.1
<i>S.D. mean</i>	11.2	10.0	4.2	4.8	
<i>Intra-psychic coherence</i>	39		16.9		
<b>ZIG-ZAGS</b>					
<i>Egocifugal movement</i>					
Maximum length	15	15	3.6	3.7	
Minimum length	7	7	2.4	2.7	
Linear fluctuation	8	8	3.5	2.3	
Maximum angle	54	46	18.3	15.0	
Minimum angle	23	23	16.8	14.5	
Angular fluctuation	32	23	14.4	10.3	
A.D.	7	8	5.7	6.7	
<i>Egocpetal movement</i>					
Maximum length	15	15	3.7	3.7	
Minimum length	7	7	2.7	2.9	
Linear fluctuation	8	7	2.3	2.3	
Maximum angle	58	50	17.5	16.0	
Minimum angle	25	24	17.0	15.5	
Angular fluctuation	34	26	14.8	10.7	
A.D.	7	8	5.5	4.6	
P.D.	-7	-5	22.0	23.3	
<b>STAIRS</b>					
P.D.	-	-	-	-	

\* These data were prepared by Alfredo de Oliveira Pereira from Measurements obtained from 177 cadets of the École Préparatoire d'Aéronautique.

Table 12 (cont.)

MEASURES	MEAN		STANDARD DEVIATION	
	Left Hand	Right Hand	Left Hand	Right Hand
<b>CIRCLES</b>				
P.D.	-6	-7	11.9	13.0
S.D.	12	11	11.1	8.5
<b>PARALLELS</b>				
<i>Egocifugal movement</i>				
Maximum length	52	50	9.5	9.0
Minimum length	37	35	7.2	7.7
<i>Egocipetal movement</i>				
Maximum length	53	50	9.6	8.4
Minimum length	37	35	7.7	7.9
P.D.	+2	+6	27.0	26.8
A.D.	12	13	8.6	10.8
<b>U's</b>				
P.D. { Sagittal	+22	+23	17.7	18.1
Vertical				
S.D. { Sagittal	-8	-6	24.2	25.6
Vertical	21	17	15.7	14.3
	18	17	13.8	14.0

Table 14\* : PRIMITIVE PEOPLES†

MEASURES	LEFT HAND		RIGHT HAND		
	Mean	$\sigma$	Mean	$\sigma$	
LINEOGRAMS					
Length of lines					
P.D.	Horizontal	36.96	10.8	36.60	9.7
	Sagittal	+1.17	21.9	+10.96	17.5
	Vertical	+16.20	16.0	+20.60	13.9
S.D.	Horizontal	+1.24	19.4	-6.24	15.2
	Sagittal	12.75	12.6	14.46	10.6
	Vertical	17.28	13.8	13.44	14.4
		13.08	10.3	13.20	11.7

\* Table 14 precedes Table 13.

† These data were derived from a sample of 25 Kaingang Indians of Irai, Brazil by Professor Baldus of l'École de Sociologie of São Paulo (47).



Table 14 (cont.)

MEASURES	LEFT HAND		RIGHT HAND	
	Mean	$\sigma$	Mean	$\sigma$
<b>ZIG-ZAGS</b>				
<i>Egocifugal movement</i>				
Maximum length	24.67	5.0	28.82	6.0
Minimum length	13.44	13.3	13.75	3.2
Maximum angle	-	-	-	-
Minimum angle	-	-	-	-
A.D.	-	-	-	-
<i>Egocipetal movement</i>				
Maximum length	28.17	5.8	34.20	4.8
Minimum length	8.00	5.0	8.87	2.4
Maximum angle	-	-	-	-
Minimum angle	-	-	-	-
A.D.	-	-	-	-
P.D.	-2.62	34.8	-3.21	35.3
<b>STAIRS</b>				
P.D.	-25.20	33.4	-7.80	30.1
<b>CIRCLES</b>				
P.D.	+2.32	18.8	+4.56	17.9
S.D.	13.60	7.9	14.60	7.6
<b>CHAINS</b>				
<i>Egocifugal movement</i>				
Sagittal A.D.	-	-	-	-
Vertical A.D.	-	-	-	-
<i>Egocipetal movement</i>				
Sagittal A.D.	-	-	-	-
Vertical A.D.	+6.77	17.7	+15.58	25.2
Sagittal P.D.	+11.00	26.9	+16.73	26.5
Vertical P.D.				
<b>PARALLELS</b>				
A.D. { Egocifugal	-	-	-	-
Egocipetal	-	-	-	-
P.D.	-3.54	42.3	+0.95	29.1
<b>U's</b>				
P.D. { Sagittal	+12.40	18.7	+21.56	18.0
Vertical	+0.64	30.4	-1.08	26.9
S.D. { Sagittal	15.56	12.8	14.80	10.4
Vertical	23.76	14.7	14.56	15.4

Table 13: URUGUAYAN MALE AND FEMALE ADOLESCENT STUDENTS, AGED 12 TO 18\*

MEASURES	MALE			FEMALE		
	LEFT HAND		RIGHT HAND	LEFT HAND		RIGHT HAND
	Mean	$\sigma$	Mean	Mean	$\sigma$	Mean
<b>LINEOGRAMS</b>						
Length of lines	35.49	7.85	33.70	33.05	7.70	32.40
P.D. {	+1.58	16.00	+0.90	+4.22	15.20	+1.58
	+19.50	13.60	+22.50	+18.10	12.81	+20.10
	+0.13	15.50	-3.00	-0.90	14.08	-7.60
S.D.	9.82	4.53	8.89	9.98	5.67	9.10
<b>ZIG-ZAGS</b>						
Maximum length	17.56	5.01	18.98	17.19	5.16	17.09
Minimum length	5.37	2.51	7.05	5.33	2.42	6.62
Maximum angle	71.90	23.10	56.40	73.00	21.20	61.70
Minimum angle	5.55	23.60	11.00	7.00	19.50	18.20
P.D.	+1.00	27.90	-1.30	-1.10	27.70	-2.60
A.D.	9.55	6.33	9.79	9.79	6.60	9.67
<b>STAIRS</b>						
P.D.	3.50	15.00	3.20	8.20	18.40	4.40
						16.00

\* These data encompass 600 cases measured at the Laboratoire Morey Otero de Montevideo.

## CIRCLES

P.D.	-1.20	14.20	-2.00	13.50	-2.40	16.60	-3.60	14.90
S.D.	11.00	8.35	11.25	7.65	13.80	8.85	11.55	9.35

## CHAINS

P.D. { Sagittal Vertical	+17.90	24.00	+23.40	24.00	+21.40	25.40	+23.20	23.60
	+6.30	22.70	+5.90	24.00	+10.70	24.60	+13.70	23.80

## PARALLELS

P.D.	+8.00	32.10	+17.70	33.10	+1.70	31.20	+11.90	31.70
A.D.	13.30	8.40	13.15	8.60	13.60	8.30	15.90	9.85

## U's

P.D. { Sagittal Vertical	+14.41	19.80	+15.60	22.60	+12.90	18.20	+11.50	20.00
	+8.50	19.50	+2.40	24.40	+1.20	22.40	+1.80	22.90
S.D. { Sagittal Vertical	21.00	13.10	14.85	11.65	16.45	13.15	13.95	11.10
	15.90	12.50	12.85	12.00	15.70	12.25	16.20	12.85

Table 15 : HOMICIDAL PERSONALITIES \*

MEASURES	LEFT HAND		RIGHT HAND	
	Mean	$\sigma$	Mean	$\sigma$
<b>LINEOGRAMS</b>				
<i>Length of lines</i>	40.80	12.3	41.40	10.1
P.D. { Horizontal	+0.80	13.7	-8.05	14.0
{ Sagittal	+17.83	12.7	+20.30	12.3
{ Vertical	-10.71	12.7	-13.37	18.6
S.D. { Horizontal	9.68	5.9	8.38	4.5
{ Sagittal	14.08	10.9	14.50	9.6
{ Vertical	12.70	10.6	11.88	6.4
<b>ZIG-ZAGS</b>				
<i>Egocifugal movement</i>				
Maximum length	20.92	7.7	22.97	8.2
Minimum length	8.82	4.9	11.80	5.4
Maximum angle	43.35	14.5	36.40	13.1
Minimum angle	8.72	15.3	11.07	13.5
A.D.	5.72	11.1	1.81	10.6
<i>Egocipetal movement</i>				
Maximum length	20.77	6.3	23.10	8.0
Minimum length	9.60	4.0	11.80	4.5
Maximum angle	46.85	17.9	40.70	16.6
Minimum angle	15.55	15.1	14.62	15.9
A.D.	7.17	11.3	4.30	11.2
P.D.	-0.67	31.9	-2.52	34.6
<b>STAIRS</b>				
P.D.	-18.87	40.5	-23.67	28.8
<b>CIRCLES</b>				
P.D.	-1.13	20.3	-8.38	18.7
S.D.	14.49	10.4	14.51	8.6
<b>CHAINS</b>				
<i>Egocifugal movement</i>				
A.D. { Sagittal	-	-	-	-
{ Vertical	-	-	-	-
<i>Egocipetal movement</i>				
A.D. { Sagittal	-	-	-	-
{ Vertical	-	-	-	-
P.D. { Sagittal	+24.96	24.4	+24.28	24.6
{ Vertical	-1.71	30.1	-20.94	25.6

\* A sample of 40 cases, 32 obtained from the prison at Rio de Janeiro, and 8 from the prison at Bahia (74).

MEASURES	LEFT HAND		RIGHT HAND	
	Mean	$\sigma$	Mean	$\sigma$
PARALLELS				
A.D. { Egocifugal	13.78	8.4	14.23	11.8
{ Egocipetal	13.70	9.3	11.08	8.8
P.D.	+11.00	35.0	+6.97	38.8
U's				
P.D. { Sagittal	+21.28	22.8	+21.13	17.7
{ Vertical	-4.39	28.3	-18.72	30.6
S.D. { Sagittal	22.03	20.6	18.62	13.4
{ Vertical	25.79	20.5	20.89	15.0

Table 16 : FAMILIAL CONSTELLATIONS\*

MEASURES	Mean				Standard Deviation			
	LEFT HAND							
	Fathers	Mothers	Boys	Girls	Fathers	Mothers	Boys	Girls
<b>LINEOGRAMS</b>								
Length of lines	40.4	41.2	40.1	38.8	8.1	9.7	12.2	7.2
Horizontal	+1.6	-5.2	-5.3	-1.9	8.2	16.2	15.9	10.8
P.D. { Sagittal	+9.5	+12.7	+13.3	+16.2	12.8	13.2	6.0	11.5
Vertical	-9.2	-3.6	-6.4	-1.7	15.8	42.2	12.7	10.2
S.D. mean	10.6	11.2	12.7	12.8	4.7	5.9	4.1	3.4
<b>ZIG-ZAGS</b>								
Egocifugal movement								
Maximum length	17.9	18.9	17.8	18.2	3.5	4.4	4.3	4.5
Minimum length	8.7	9.5	8.3	8.5	2.1	3.0	3.1	3.0
Maximum angle	51.7	44.1	55.0	51.8	17.1	15.2	11.9	18.3
Minimum angle	15.5	18.0	21.6	16.1	17.0	14.0	15.4	10.9
A.D.	7.0	7.1	6.6	9.1	3.9	5.5	4.9	7.1
Egocipetal movement								
Maximum length	17.9	19.5	17.3	19.2	4.1	4.8	4.5	4.6
Minimum length	9.5	10.2	9.1	9.9	1.6	3.5	2.7	3.6
Maximum angle	51.1	46.0	58.4	54.9	16.4	17.7	15.5	18.5
Minimum angle	23.6	15.9	27.5	19.6	14.6	13.3	18.7	15.1
A.D.	7.1	6.5	7.8	8.0	4.1	4.5	3.0	6.1
P.D.	-12.1	-3.1	-5.1	-4.5	27.5	26.7	22.2	19.3

\* A sample of 20 families from Rio de Janeiro (77).

## STAIRS

+4.2	+11.2	+22.3	+17.9	26.8	22.0	21.2	31.2
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## CIRCLES

-6.0	-11.4	-12.0	-12.3	14.4	14.1	16.3	13.0
11.7	14.5	19.2	12.5	8.2	11.7	9.2	7.7

## CHAINS

### Egocifugal movement

12.1	15.1	16.8	14.5	8.8	11.9	10.8	6.9
13.5	11.3	11.1	14.0	8.8	8.8	8.8	8.8

### Egocipetal movement

11.1	16.9	10.8	13.0	11.9	9.7	8.1	10.7
14.3	14.7	17.0	13.4	10.7	11.7	9.9	8.5
+26.3	+25.5	+18.1	+15.5	27.2	29.0	19.0	27.1
-0.5	-2.9	-1.2	-10.7	27.2	7.7	27.7	27.4

## PARALLELS

Max. { Egocifugul	52.2	50.6	51.5	47.5	10.9	11.8	6.4	8.7
length { Egocip:tal	49.8	51.3	54.6	53.2	7.6	11.7	5.3	9.2
Mib. { Egocifugul	37.4	33.9	34.8	34.4	6.3	4.9	7.1	7.0
length { Egocip:tal	36.6	36.1	37.3	36.9	7.3	6.8	2.9	9.9
P.D.	+3.0	+0.2	-8.5	+10.5	41.9	29.9	26.4	33.7
A.D. mean	16.2	12.1	14.2	13.9	10.3	7.8	8.5	5.6

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P.D.	Sagittal	+9.9	+20.0	+10.8	+19.0	17.3	24.4	21.9	20.6
	Vertical	-1.1	-4.2	-13.7	-2.2	19.1	17.4	23.6	21.3
S.D.	Sagittal	16.0	26.5	16.6	17.0	14.9	15.1	10.1	18.8
	Vertical	17.3	26.5	14.8	17.0	11.0	19.8	7.3	10.9

Table 16 (cont.)

MEASURES	RIGHT HAND					Standard Deviation		
	Mean					Fathers	Mothers	Boys
	Fathers	Mothers	Boys	Girls	Fathers	Mothers	Boys	Girls
<b>LINEOGRAMS</b>								
Length of lines	39.3	38.1	38.0	35.6	6.5	8.5	7.7	6.5
Horizontal	-0.4	+0.7	+1.3	+2.2	10.6	16.6	12.1	10.8
P.D. { Sagittal	+12.9	+17.0	+20.3	+15.2	8.9	10.7	8.1	8.9
Vertical	-10.4	-10.6	-11.3	-6.3	16.1	14.2	11.8	11.3
S.D. mean	8.8	10.3	9.6	10.4	3.9	4.8	2.3	3.0
<b>ZIG-ZAGS</b>								
<i>Ecotifugal movement</i>								
Maximum length	19.1	20.0	18.0	19.6	3.5	6.0	4.1	3.6
Minimum length	10.1	10.5	8.6	10.5	2.2	3.7	2.5	3.8
Maximum angle	42.6	40.7	46.3	43.8	12.7	14.5	8.9	14.6
Minimum angle	16.5	18.0	22.4	18.5	15.1	12.2	10.7	13.6
A.D.	4.2	7.8	7.3	7.5	4.7	6.4	5.3	6.1
<i>Ecocipetal movement</i>								
Maximum length	18.5	20.2	16.8	20.5	4.2	6.5	2.5	5.1
Minimum length	10.3	11.9	9.8	10.8	2.5	4.6	2.0	3.2
Maximum angle	45.6	40.4	54.8	51.1	17.6	13.7	9.9	17.6
Minimum angle	23.4	18.5	26.9	23.5	13.0	14.8	11.5	15.7
A.D.	6.1	8.4	6.3	8.8	4.3	6.1	2.9	5.5
P.D.	-10.8	-1.7	-9.9	-6.7	24.5	25.1	23.1	23.1
<b>STAIRS</b>								
P.D.	-7.3	+6.0	+10.1	+8.4	21.2	26.7	20.6	14.2



## CIRCLES

P.D.	-14.4	-11.9	-14.1	-10.0	10.1	13.2	16.8	10.0
S.D.	8.6	16.2	12.5	11.0	6.7	10.3	8.4	6.9

## CHAINS

*Egocifugal movement*

A.D. { Sagittal	12.3	16.1	13.2	8.8	9.2	10.6	6.7	4.9
Vertical	12.3	14.0	17.8	12.0	7.6	10.3	16.4	11.4

*Egocipetal movement*

A.D. { Sagittal	15.2	17.1	10.4	11.2	11.8	10.5	8.5	9.9
Vertical	9.1	14.7	9.7	11.2	6.5	11.9	4.9	6.9
P.D. { Sagittal	+23.5	+17.2	+14.4	+19.7	24.3	26.4	27.1	19.8
Vertical	-10.5	+6.1	-18.1	-3.2	26.6	24.2	27.0	29.7

## PARALLELS

Max. { Egocifugal	51.8	49.0	47.2	44.5	11.7	11.1	5.0	6.8
length { Egocipetal	52.0	48.6	49.8	50.8	15.1	9.6	7.1	14.3
Min. { Egocifugal	35.9	33.1	30.9	31.7	9.0	5.8	5.5	6.6
length { Egocipetal	36.8	34.6	34.3	34.4	8.4	6.4	5.8	8.2
P.D.	+1.0	+2.1	-2.2	+16.7	34.3	25.8	21.5	35.6
A.D. mean	16.3	13.5	15.4	16.9	10.3	6.8	6.4	8.4

## U's

P.D. { Sagittal	+15.3	+22.5	+19.1	+21.7	11.9	15.4	14.9	16.5
Vertical	-14.5	-6.1	-15.5	-14.1	17.5	18.0	20.2	25.7
S.D. { Sagittal	8.7	18.9	11.7	18.3	7.1	17.4	6.2	13.4
Vertical	13.7	15.8	14.8	15.8	11.0	15.4	12.0	11.1

Table 17 : VARIOUS COEFFICIENTS OF RELIABILITY AND VALIDITY\*

## MEASURES

## WITH A MINIMUM INTERVAL OF 7 DAYS

P.D. of Zig-Zags with both hands	0.62
Vertical P.D. of the right hand	0.66
Sagittal P.D. of both hands	0.71
Length of lines with both hands	0.71
P.D. of Lineograms and sagittal Chains with the left hand	0.52
P.D. of Lineograms and sagittal U's with the left hand	0.60
P.D. of Lineograms and Circles with the left hand	0.53
Negative angles of Zig-Zags and neurosis index in the Bernreuter questionnaire	0.71
Intra-psychic coherence of both hands	0.55

## WITH A MAXIMUM INTERVAL OF ONE YEAR

*Vertical Plane*

Lineograms left hand	0.76
Lineograms right hand	0.52
Stairs left hand	0.23
Stairs right hand	0.28
Circles left hand	0.52
U's left hand	0.36
U's right hand	0.42

*Sagittal Plane*

Lineograms left hand	0.57
Lineograms right hand	0.41
Zig-Zags left hand	0.34
Zig-Zags right hand	0.60
Parallels left hand	0.47
Parallels right hand	0.37
U's left hand	0.65
U's right hand	0.65

*Horizontal Plane*

Lineograms left hand	0.20
Lineograms right hand	0.21

\* These measures were made upon Uruguayan adolescents (61, 72).

Table 18 : TETRACHORIC COEFFICIENTS OF THE VARIOUS  
PRIMARY DEVIATIONS\*

MEASURES		Tetrachoric Coefficients (multiply by 1.000)							
HAND		1	2	3	4	5	6	7	8
Horizontal Lineogram	Left	-							
	Right	-266							
Sagittal Lineogram	Left	356	214						
	Right	286	420	834					
Vertical Lineogram	Left	110	052	064	176				
	Right	-108	-036	-087	-458	374			
Zig-Zag	Left	-114	-099	-257	049	145			
	Right	-131	-252	-215	021	-035			
Stairs	Left	031	-220	832	-215	599	000		
	Right	036	061	215	126	185	030	995	
Circles	Left	065	096	097	052	020	104	075	-021
	Right	005	-173	-002	194	255	289	-031	-080
Parallels	Left	005	038	038	-074	088	005	025	060
	Right	-010	-106	-340	-208	202	380	065	-070
Vertical U's	Left	163	000	-039	047	365	088	467	
	Right	034	-049	-125	216	040	146	210	135
Sagittal U's	Left	383	-029	035	232	110	050	035	115
	Right	-071	-146	300	-220	143	150	-133	
							-780	362	
							-448		

\* These data are based upon the measures obtained from 177 Brazilian adolescents by Professor Oliveira Pereira.

Table 19 : RELIABILITY COEFFICIENTS OF VARIOUS PARTS OF THE M.K.P.\*

MEASURES	HAND		MEASURES	HAND	
	L	R		L	R
<i>Vertical P.D.</i>			<i>S.D.</i>		
Lineograms	.45	.27	(without direction)		
Stairs	.58	.49	Vertical Lineogram	.27	.07
Circles	.43	.39	Horizontal Lineogram	.17	.45
U's	.49	.55	Sagittal Lineogram	.28	.14
<i>Sagittal P.D.</i>			Vertical Circles	.37	.10
Lineograms	.32	.32	Vertical U's	.42	.26
Zig-Zags	.16	.13	Sagittal U's	-	-
Chains	.57	.43	<i>S.D.</i>		
U's	.47	.54	(with direction)		
<i>Horizontal P.D.</i>			Vertical Lineogram	.37	.28
Lineograms	.46	.22	Horizontal Lineogram	.31	.28
<i>Length of lines</i>			Sagittal Lineogram	.38	.31
Vertical Lineogram	.46	.44	<i>A.D.</i>		
Horizontal Lineogram	.39	.35	Egocifugal Zig-Zag	.37	.45
Sagittal Lineogram	.50	.11	Egocipetal Zig-Zag	.44	.40
Egocifugal Zig-Zag	.52	.47	Egocifugal Chains	.58	.49
Egocipetal Zig-Zag	.52	.56	Egocipetal Chains	.24	.46

\* These data are based upon the measures obtained from 231 subjects by Marti Takala (98).

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## **A D D E N D U M**

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FOLLOWING BIBLIOGRAPHIC REFERENCES AFTER  
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